Venmo Redesign

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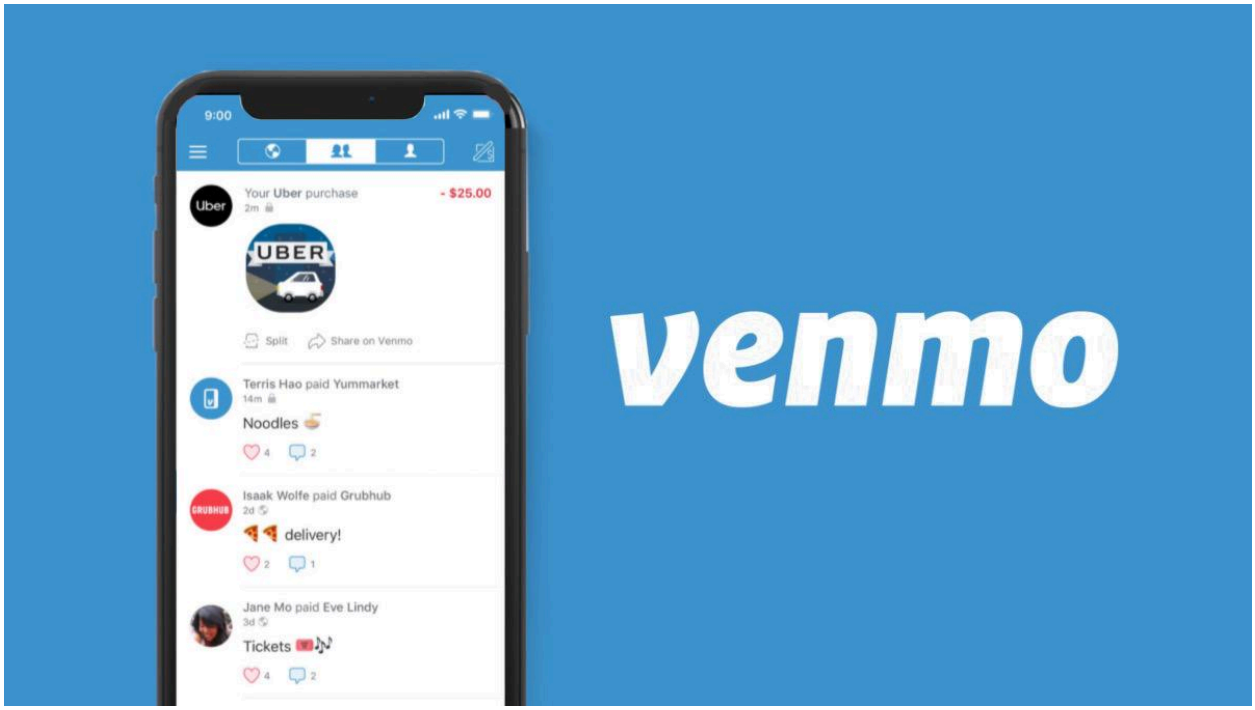

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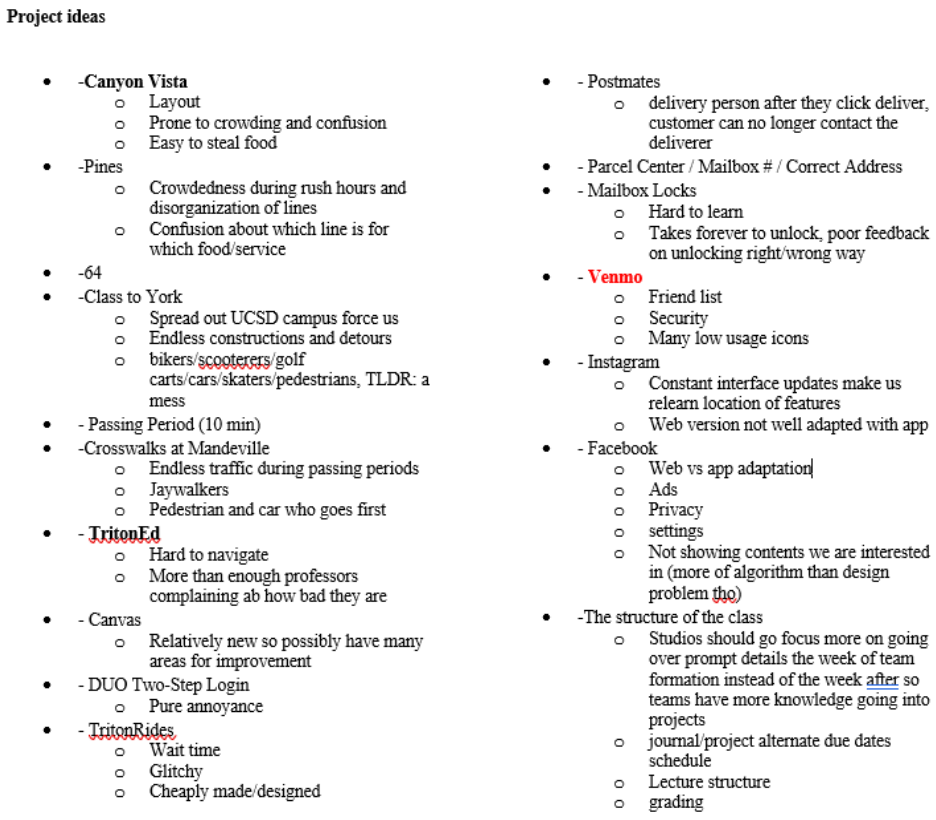
Introduction

Our Final Project design team was founded in the SW corner table of HSS 1346 on a fine Week 7 Wednesday shortly before noon by aspiring designers Doris, Ethan, Julia, Xinyan, and Yue. None of these members were familiar with nor have worked with one another in any of the previous projects.

Brainstorming

Upon team formation, the five members immediately set out to ***brainstorm*** a final project idea by shouting out different things in our daily lives that frustrate us. Within 20 minutes, our team came up with a diverse list of items we would like to redesign ranging from physical spaces on campus, to technology like apps and websites, and even to the structure/schedule of a course. The complete list of ***brainstormed*** ideas is shown in **Figure 1** below.



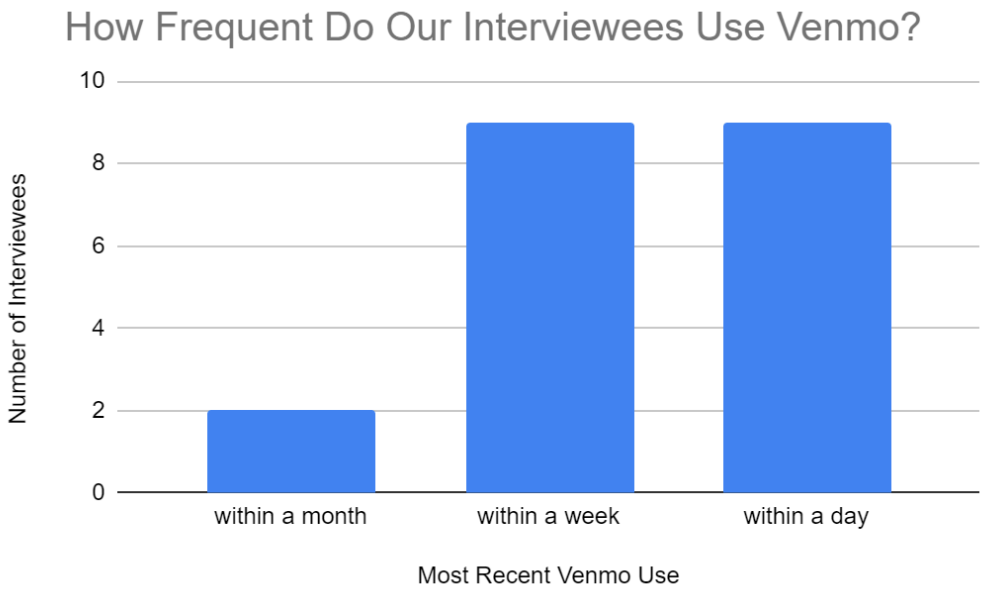
Project ideas

- **-Canyon Vista**
  - Layout
  - Prone to crowding and confusion
  - Easy to steal food
- -Pines
  - Crowdedness during rush hours and disorganization of lines
  - Confusion about which line is for which food/service
- -64
- -Class to York
  - Spread out UCSD campus force us
  - Endless constructions and detours
  - bikers/scooterers/golf carts/cars/skaters/pedestrians, TLDR: a mess
- - Passing Period (10 min)
- -Crosswalks at Mandeville
  - Endless traffic during passing periods
  - Jaywalkers
  - Pedestrian and car who goes first
- - **TritonEd**
  - Hard to navigate
  - More than enough professors complaining ab how bad they are
- - Canvas
  - Relatively new so possibly have many areas for improvement
- - DUO Two-Step Login
  - Pure annoyance
- - TritonRides
  - Wait time
  - Glitchy
  - Cheaply made/designed
- - Postmates
  - delivery person after they click deliver, customer can no longer contact the deliverer
- - Parcel Center / Mailbox # / Correct Address
- - Mailbox Locks
  - Hard to learn
  - Takes forever to unlock, poor feedback on unlocking right/wrong way
- - **Venmo**
  - Friend list
  - Security
  - Many low usage icons
- - Instagram
  - Constant interface updates make us relearn location of features
  - Web version not well adapted with app
- - Facebook
  - Web vs app adaptation
  - Ads
  - Privacy
  - settings
  - Not showing contents we are interested in (more of algorithm than design problem tho)
- -The structure of the class
  - Studios should go focus more on going over prompt details the week of team formation instead of the week after so teams have more knowledge going into projects
  - journal/project alternate due dates schedule
  - Lecture structure
  - grading

Figure 1: Project Idea Brainstorming

Upon the proposal of a new idea, all team members were encouraged to share their ***experiences*** with the proposed idea, specifically ***experiences*** of frustrations and difficulties encountered by users during their interactions with the design under discussion. Since all of us had yet to know each other well enough to be rude, our judgement-free and supportive setting yielded vigorous and diverse inputs from everyone. At 17 potential project ideas, our team started narrowing down our options, eventually deciding that our project focus will be either 1) a campus dining hall, or 2) an app. Our team did not immediately decide on a topic because not a single idea received overwhelming support from our members. To ensure that our whole team will be fully committed to our project, we decided to give it a few more days for members to ***brainstorm*** and observe ***problems*** associated with dining halls and different apps. By the end of the week, with the help of a couple office hours, our team decided to focus our project on an app, since we would rather choose to interview available app users than hungry and impatient people inside dining halls.

Out of our initially ***brainstormed*** *app*-licants, Venmo eventually came out top. We observed that although Venmo offers many layers of features, most people only use its function for paying people, which may be a ***signifier*** to how the "other" Venmo functions are hard to locate or use. In addition, since Venmo is a staple app used among college students (See **Graph 1**), we figured it shouldn't be too hard to find college students on a college campus for interviews so we made interviewing college students a ***constraint***. Also, it helps to choose an app our team can all relate to so we would feel more passionate about discovering its ***problems*** and ***redesigning*** it for the better.



Graph 1: Frequency of Usage of Venmo
(Out of the 20 interviewees aged 19-21, 18 of them used Venmo within the past week, illustrating the popularity of Venmo among college-aged students)

Interview Methodology

Once we decided to focus on Venmo, our team used the ***Double Diamond Model of Design*** to guide us through the project in finding the right ***problems*** and coming up with the right ***solutions*** addressing these ***problems***.

The problem-finding process began with us drawing a ***mind map*** for Venmo, shown in **Figure 2** below. We dove into many aspects of Venmo regarding "who" uses it, "when" people use it, "what" users use it for, and what the app offers itself. This ***mind map*** helped us ***understand*** Venmo better as a team and it served as the backbone for our interview ***methodology***.

Figure 2: Venmo Mind Map

Initial Interview Questions

Our team first came up with a set of interview questions shown in **Figure 3** below that included two general question sections (one for general knowledge and one for

redesign suggestions) and a task question section assigning users to use different features of Venmo listed in the ***mind map***. From the ***errors*** users make during the tasks, we hoped to gain insights that would help us ***discover problems*** of Venmo for the ***problem space*** in the ***Double Diamond Model of Design***. However, upon conducting a trial run of interviews with 1-2 interviewees each, our team members extrapolated results and was troubled when we realized our list of task questions may not provide meaningful insights for in-depth analysis because our questions were all over the place and lacked focus. In addition, so many of our assigned tasks were so simple that it lacked room for us to identify specific ***problems*** of Venmo.

General Knowledge

1) When was the last time you used Venmo? How long have you used Venmo?
2) What was your experience using Venmo? (why did/do you use it)
3) What are your general thoughts on Venmo and its design (ask them to elaborate on pros/cons)?

Tasks

4) Can you tell me what each button at the top of the homepage means (the globe/two human heads/one human head)?
5) Show me how you would pay someone.
6) Show me how you would request money from someone
7) Show me how you would block someone on Venmo.
8) Show me how you would change the privacy settings on a past transaction.
9) Show me how to add friends on Venmo through searching and scanning code.
10) How would you find your friends on Venmo?
11) Have you ever transferred money from Venmo to the bank before?
    a) What do you know about the transfer process/show us how to do it.
    b) Do you know how to transfer money in Venmo to the bank and how long it takes? (ask them about the process)

Redesign/Improvements

12) Do you have any suggestions about the app?

Figure 3: Initial Interview Questions (Scrapped)

In the following studio section, we consulted different TA's and IA's for their critiques on our questions. Tricia specifically pointed out that our questions were unorganized and did not tie to one another. In addition, two studio IAs suggested that instead of identifying individual ***problems*** from all these unrelated tasks, we should relate the questions to each other (similar to following a process) so it would be easier for our team to identify ***problems*** that take place in between and eventually narrowing it down to a "main" ***problem***.

Following the suggestions, we heavily refined our task questions. With the help of another IA during office hours, we explored deeper into different Venmo features and

organized our task questions into three subcategories that we found were particularly prone to user errors: “adding friends”, “paying others”, and “privacy settings”. Under each of these subcategories, we came up with 2 to 4 process-type questions to task users during our interviews. Organizing our task questions into subcategories and including at least three questions in each would essentially help us ***diverge*** the ***problem space*** while keeping the structure of our interview organized.

The general question categories of our initial interview were slightly modified. Some main changes include our team making question 1 (**Figure 3**) more specific by asking for the *last two times* a user use Venmo instead of just the most recent time so we get a more accurate picture of how frequently a user uses Venmo. We also combined similar questions (such as 2 and 3 in **Figure 3**) and moved them to the more fitting final thoughts/redesign section.

After all that hype, here is the final reveal of our refined and revised interview questions (parenthesized words are notes) starting with the category “general knowledge”.

Revised Interview Questions

General Knowledge

1. Have you ever used Venmo? (to make sure they qualify for interview)
2. When was the last two times you used Venmo? (to gauge how frequent they use Venmo and possible how well they know the app)
3. How long have you used Venmo? (to gauge how well they know the app along with question 2)
4. What do you usually use Venmo for? (to gain insight for what users use Venmo for)

Figure 4: Final Interview Questions
Category “General Knowledge”

These “general knowledge” questions allowed our group to gather ***qualitative*** data (expert vs novice user) to help us see just how familiar with the Venmo app they are and eventually how that will affect the way they execute the tasks we will give them next. We admittedly did choose generic questions such as #1 to #3 asking them, respectively, if they had ever used Venmo before, when were the two most recent times they used Venmo, and the duration that they have been using Venmo for but we felt it was necessary because this determined whether the interviewee located the function because they remembered where it was or whether they were able to figure it out with little prior knowledge (**Figure 4**). The final “general knowledge” question, #4, was used to help us determine what users typically use Venmo for (**Figure 4**). Admittedly here too, we got a little help with our trial set of interview questions and that’s why our results fell in line with the tasks we chose to ask in this final set of questions.

After we asked our “general knowledge” questions, we moved on to “tasks” in which we asked each interviewee to show us how *they* would complete each specific task following the ***master-apprentice model***. The tasks are displayed below as follows:

Tasks

Adding Friends

5. How would you add me as a friend on Venmo? (Don’t give them your username or let them scan your code until they ask for it)
6. Why did you choose this method (instead of scanning/searching etc.) to add me as a friend? (take notes of their reasoning for why they chose that specific method)
7. Locate me from your friend list. Look for errors. (write down each step that they take while going through this task)

Paying

8. Show me how you would pay me $0.01 (Take notes of the process, look for errors)
9. Show me how you would pay me and “dsgn1” $0.01 together. (take note of their process and errors)
10. What do you usually write in the message section when you pay or request money from someone? (put down what they say)

Privacy

11. Show me how you would change the privacy settings of our past transaction (the $0.01 transaction).
12. Show me where you would go to set your default transaction setting (write down process and errors)
13. Show me how you would block me. (write down process and errors)
14. Do you know you can set a password specifically for Venmo before opening the app? (this is an intentional yes or no question for us to gauge how many people knew of this function; This refers to the Touch ID & Pin not the account password)
    a. If yes, how would you change your Pin/Touch ID? (have them get to the location where they are about to change the pin and that will be enough, note down the process and errors)
    b. If no, how would you change your Pin/Touch ID? (have them get to the location where they are about to change the pin and that will be enough, note down the process and errors)

Figure 5: Final Interview Questions
Category “Tasks”
Subcategories “Adding Friends”, “Paying”, & “Privacy”

To keep our data consistent and controlled, our group agreed to use an iPhone, specifically the iOS version 7.41.1 of the Venmo app. The reason we specified it is because when we compared the Android version and the iOS version, we discovered that not only did specific icons appear differently in each version, Android contained different wording than iOS and our group agreed that the iOS app was the confusing one which will be the more likely candidate to need a ***redesign***. Of course, most importantly, we needed to make sure that each of our interviewees goes through the same ***experience*** layout-wise when executing their interview.

For each task the interviewee did, each of us wrote detailed notes and observations and then transferred the results to a google form afterwards (form linked near bottom of document). This ***methodology*** of extensive note-taking was used throughout the entire interview, not just the tasks category. Since we did not choose to videotape any of our interviewees we made sure to list out each step and misstep that they did throughout this part of the interview. From this, we gained valuable ***qualitative*** and ***quantitative*** data that helped us identify patterns and analyze them, eventually identifying the main ***problems*** that we focused on for our ***problem statement*** and ***redesign***.

There are many good reasons we chose to include these specific categories of tasks. One of the main reasons was because gathering from our group's personal ***experience*** with Venmo and our trial interviewees' ***experience***, we found that most users of Venmo simply want to use the app as a convenient way to pay or request money from someone, usually their friends or colleagues. Added to that, they want to have a way to make sure their money is safe so we felt that it was necessary to have tasks pertaining to these topics to more accurately gauge how we would not only improve users' ***experience*** with the app but also to get users to trust it more.

Finally, after the tasks were over, we included these two "final thoughts/redesign" questions displayed below:

Final Thoughts/Redesign Suggestions

15. What are your general thoughts on Venmo and its design (ask them to elaborate on pros/cons)?
16. Go back to their errors, if you didn't ask why they made a certain error earlier, ask them "I noticed you had trouble with this, why do you think you had trouble with this?"

Figure 6: Final Interview Questions
Category "Final Thoughts/Redesign"

In the Final Thoughts section of our revised interview questions, we added question #15 to hear the interviewees' personal perspectives on their ***experience*** and question #16, to gain insights on why users made specific ***errors*** during interview.

Our group chose to include these specific questions as the wrap-up questions because we felt that it would be more useful to gauge users' thoughts in more detail after they ***experienced*** the list of tasks that they had to execute. When we started out with the preliminary "general knowledge" questions, we simply wanted to internally gauge the kind and the amount of ***experience*** each user had whereas this "final thoughts/redesign" category contains questions that allowed us to actively gauge what our interviewees felt about the app after that extensive ***experience***. In this section, we got to hear and observe our interviewees express honestly what they felt about the app and what they valued in regard to improvements.

Interview Guidelines

If our interviewees didn't know how to do something, we followed-up by asking them to try it anyway. Our group agreed to put down as many notes as we can that represent what the interviewee said and did (sometimes using recording aids), and specifically ordered to note down everything the interviewees press, the order they press it, and any errors made.

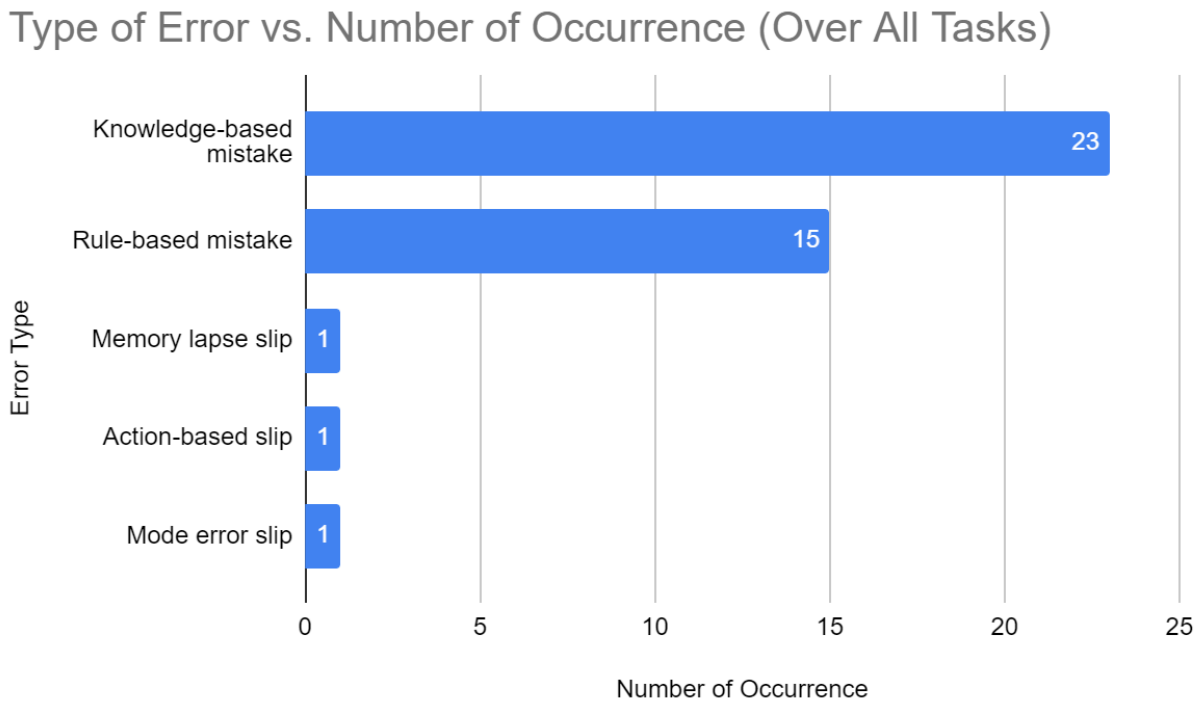
We kept our revised questions ***open-ended*** and avoided leading and yes/no questions. We revised our google form and continued to use it to record all the interview responses. When we finally obtained the data for this final set of interview questions, we ended up with 20 interviewees total. This number of interviewees allowed us to gain very valuable insight into what the actual ***problems*** that users have when using Venmo.

To ensure our interview data stays ***consistent*** and ***insightful***, our team used one full lecture team time to go over the finalized interview questions one by one as a group and performed individual interview demonstrations. Throughout our interviews, we took detailed notes of what interviewees do, sometimes using recording aids to help. In addition, when one team member did not conduct interviews to the team standards, we asked the member to redo them.

Data Trends & Analysis

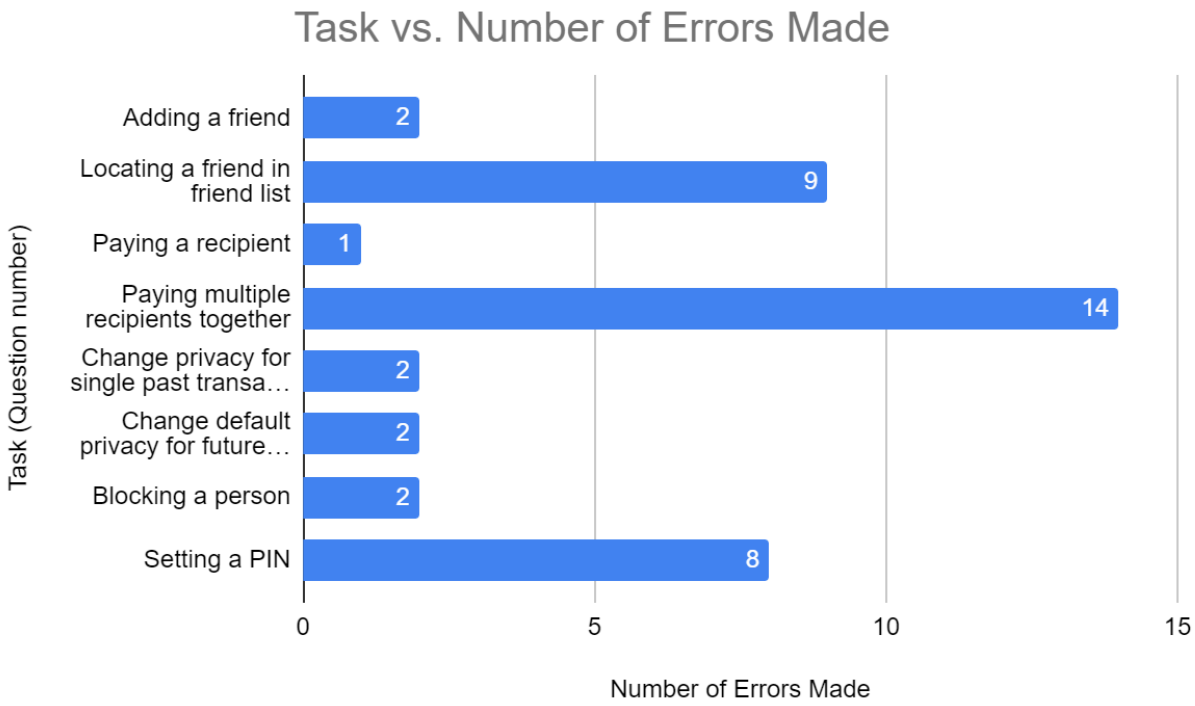
We identified many errors during data collection. This section provides an in-depth analysis. A complete list of errors can be viewed at the bottom of this document and in the spreadsheet.

Data Analysis & Errors



Graph 2: Number and Type of Mistakes and Slips Made (includes all errors not just the core ones)

After obtaining our final interview results, we found many ***trends***. Many of our interviewees made ***errors*** when executing the tasks portion of the interview. Here, displayed in **Graph 2** are, in the y-axis, the types of ***mistakes*** and ***slips*** that were made and, in the x-axis, how often each occurred. This graph gives a visual image of how frequent each specified ***error*** was made. In **Graph 3**, shown below, a visual breakdown of the tasks that resulted in at least one type of ***error*** and how many ***errors*** it actually caused.



Graph 3: Type of Tasks v.s. Number of Errors Made For Each Task (these show only the tasks where errors occurred)

We found ***errors*** in our very first task question under "adding friends" (**Figure 5**, question 5). The question asked "***How would you add me as a friend on Venmo?***" We observed that ***2 out of our 20 interviewees*** made errors when attempting the task. One of them looked through the entire homepage before finally navigating to search people and figuring out how to add a friend there. Judging from this interviewee's lack of experience using Venmo and also having the wrong ***mental model*** because she had no prior knowledge of how to add a friend, it makes sense to define the error she made as a ***knowledge-based mistake***. The other person who made an error while figuring out how to add a friend went through a very similar process as the previous person but we classify this error as a ***memory-lapse slip*** because this interviewee had the correct ***mental model*** of adding a friend, he just momentarily forgot where the function was and tapped on the wrong icon before tapping on the correct icon.

Next, in the other "adding friends" task question, "***Locate me from your friend list***", ***9 out of 20 people*** made errors, in this case, all ***knowledge-based mistakes*** (**Figure 5**, question 7). ***5 people*** went to "profile", ***4 people*** went to the homepage and looked through there, ***2 people*** also went to settings, and ***2 people*** got to the friends list but was confused by "top people" and "friends". Our group chose to classify all of these ***errors*** as ***knowledge-based mistakes*** because during each of these ***9 interviews***, all the interviewees did not know that a friend list existed beforehand and they all had the

wrong ***mental model*** when it came to where they thought the friend list was located. There were issues with locating the friend list, which was the goal of the task, and an underlying issue of not recognizing the list as the friend list or not ***understanding*** how it works.

Now, in the second subcategory of the "tasks" called "paying", the question "***Show me how you would pay me $0.01***" resulted in one minor ***error*** (**Figure 5**, question 8). ***1 person out of our 20 interviewees*** made an ***action-based slip*** because he accidentally typed $0.1 instead of $0.01 when he had the correct ***mental model*** but accidentally typed one less "0" but corrected it immediately after he typed it.

Another set of ***errors*** were made in the "paying" subcategory of the tasks, specifically in the question "***Show me how you would pay me and "dsgn1" $0.01 together***" (**Figure 5**, question 9). There were ***rule-based mistakes*** and ***knowledge-based mistakes*** resulting from attempting to do this task. First of all, out of our ***20 interviewees***, ***12*** paid both recipients together in the same transaction and ***8*** paid each recipient separately. The ***8 people*** who paid the two recipients separately committed ***knowledge-based mistakes*** because they had the wrong ***mental model*** to begin with when being told to execute this task. As for the ***12 people*** who had the right ***mental model***, ***6 out of those 12*** only had it when initially executing the task so they made ***rule-based mistakes*** when they tried to add a recipient as they had the wrong ***mental model*** because they followed the wrong rule. Out of the ***6 people***, ***4 people*** tagged another recipient by wrongfully tapping on the "tag icon" which looks a lot like it could mean "add a recipient" as the icon shows a tiny person and even tinier tag. It is understandable why users would wrongly assume that the icon represents "adding a recipient". Then, out of the 6 people again, ***3 people*** tried tapping the white space next to the recipient's name, following the wrong rule to add a recipient. The reason why the numbers here add up to 7 not 6 is because 1 of these 6 people who made ***errors*** tried tagging another recipient and tried tapping on the white space. All these errors support our recurring ***problem*** of unclear ***signifiers***.

Finally, we get to the final "task" subcategory, "privacy". The task asked here was "***Show me how you would change the privacy settings of our past transaction (the $0.01 transaction)***" (**Figure 5**, question 11). ***2 out of 20 people*** made ***errors*** here. ***1 out of the 2*** made a ***knowledge-based mistake*** and went to edit profile when the task is asking them to change the privacy setting of the $0.01 transaction. When asked why they made the ***error***, they responded that their ***mental model*** led them to believe that they must modify their profile somehow. The other ***1 out of 2*** made a ***mode-error slip*** because they had the correct ***mental model*** as the interviewee was about to tap the "two head icon" on the homepage but instead accidentally tapped on the globe icon which is located right next to it.

The next task is similar but also completely different from the previous task. The task question is called "***Show me where you would go to set your default transaction setting***" (**Figure 5**, question 12). ***2 out of 20 people*** simply did not ***understand*** the

difference between this task and the previous task. They both made ***knowledge-based mistakes*** as they have the incorrect ***mental model*** as they had no clue how to navigate to this function. Although they eventually found it after pretty much combing through the entire app, this indicates that this function is very unclear and lacks ***signifiers***.

Now, here is the task in the "privacy" subcategory that says, "***Show me how you would block me***" (**Figure 5**, question 13). ***2 out of 20 people*** made ***errors***, one of them a ***knowledge-based mistake*** and the other a ***rule-based mistake***. ***1 of them*** tried looking for the function through settings and that is a ***knowledge-based mistake*** because that interviewee did not have the correct ***mental model*** nor knowledge to smoothly find the function. The other ***1 of the 2***, successfully navigated to the profile page but used the wrong method to navigate to the final destination. This is a ***rule-based mistake*** because this interviewee knew where to go initially but had the wrong ***mental model*** of where the function to block someone is.

Here is the final task in the "privacy" subcategory and the final task that resulted in ***error***. The question associated with the ***errors*** here is as follows: "***If no, how would you change your Pin/Touch ID?***" (**Figure 5**, question 14 part b) To provide some context with that question, our main question was "***Do you know you can set a password specifically for Venmo before opening the app?***" (**Figure 5**, question 14) We intentionally made this a yes or no question because our goal here is to gauge whether the interviewee knew about the function before we dove into asking them to do the task. So therefore, when we looked through our interview results, we found that ***8 out of 20 interviewees*** made ***errors***. ***5 out of the 8*** pressed the "change password" option which is located in settings and that is classified as a ***rule-based mistake*** because they confused the pin with the account password, therefore following in the wrong rule to execute the task. ***2 out of the 8 people*** went to "privacy" in settings and this is also classified as a ***rule-based mistake*** because although it is possible that a pin setup can be under "privacy", it is actually under "security", so once again the interviewee followed the wrong rule to locate the pin setup function. Finally, ***1 out of the 8 people*** navigated to profile and that is a ***knowledge-based mistake*** because the interviewee have the wrong ***mental model*** of where the function is located and it also didn't help that the interviewee had no prior knowledge of this function. These errors were made because of our main theme: unclear ***signifiers***.

The most common type of ***error*** that we found in our interview results is ***knowledge-based mistakes***. The next most common type of error is ***rule-based mistakes***. These two ***errors*** fall perfectly in line with our main claim that the biggest ***problem*** with Venmo is that many of its functions contain unclear ***signifiers***. These two types of errors were also the ones that shaped the 3 core ***problems*** that we chose to focus on.

Core Problems

From the data that we analyzed above, our group decided to focus on 3 core ***problems***. While it is clear that many other ***errors*** were made, we felt that by focusing on these 3 ***problems*** where users made the most ***errors*** our team will be able to create the most impactful redesign for the large and diverse pool of Venmo users. From general question #3, we learned that Venmo users mainly use the app to pay or request money from their friends. Therefore, we identified the ***problem*** of being unable to locate your friends, the ***problem*** of not knowing that you can add more than one recipient to the same transaction to save time, and the ***problem*** of not knowing that you can protect your app with a security measure to prevent you from potentially losing your money are our main priorities when it comes to ***redesigning*** the app.

Focusing on the 3 core ***problems*** themselves, it is frustrating having to type in your friend's name or username every time you need to pay them since the friends list is so hard to locate resulting in the ***trends*** of various ***knowledge-based mistakes*** and ***rule-based mistakes***. The reasons for these ***errors*** will be specified and explained in detail below.

Even after we let our interviewees know that these functions exist, they still struggle with finding the location of the functions. This results in a gap between the ***gulfs of execution and evaluation*** because when they tap on one place within app because their ***mental model*** told them that they need to go there to find the function and it isn't there they become confused because now they need to figure out what happened in the ***gulf of evaluation*** but they can't because it is so difficult to find the function in the first place.

Here are the 3 core ***problems*** explained in depth:

Core Problem 1: Locating a friend from friend list

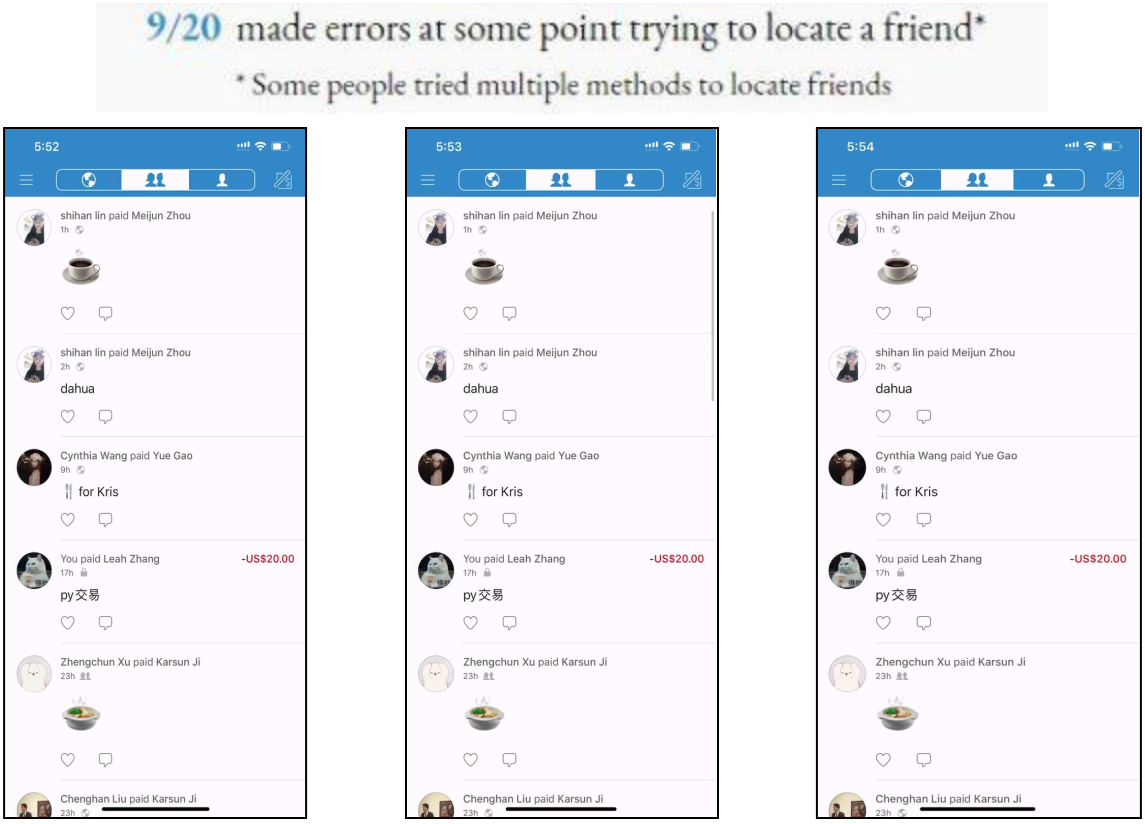


Figure 7: Problem #1 - Locating & Using the Friends List

The first core ***problem*** is that among the ***20 interviewees***, there are ***9 people*** who made ***errors*** when they tried to locate the friends list. To break it down, within those 9 people who made ***errors***, ***5 out of 9*** navigated to their profile thinking Venmo could be like Facebook and their friends would be located there, ***4 out of 9*** looked through their homepage hoping it may be right in front of them, and finally for ***2 of those 9*** people when either of those previous methods did not work, they resorted to attempting to look through the entire settings list (**Figure 7**, left to right respectively).

Because these ***9 people*** did not previously know that there was a friends list before they went through the interview, we defined the ***errors*** that they made as ***knowledge-based mistakes***. Although the ***9 people*** who made these ***errors*** eventually found the friends list, these struggles that our interviewees had show that the Venmo app lacks a ***signifier*** to show users that the friends list can be found in “search people” under the sidebar menu.

Core Problem 2: Adding more recipients to the same transaction

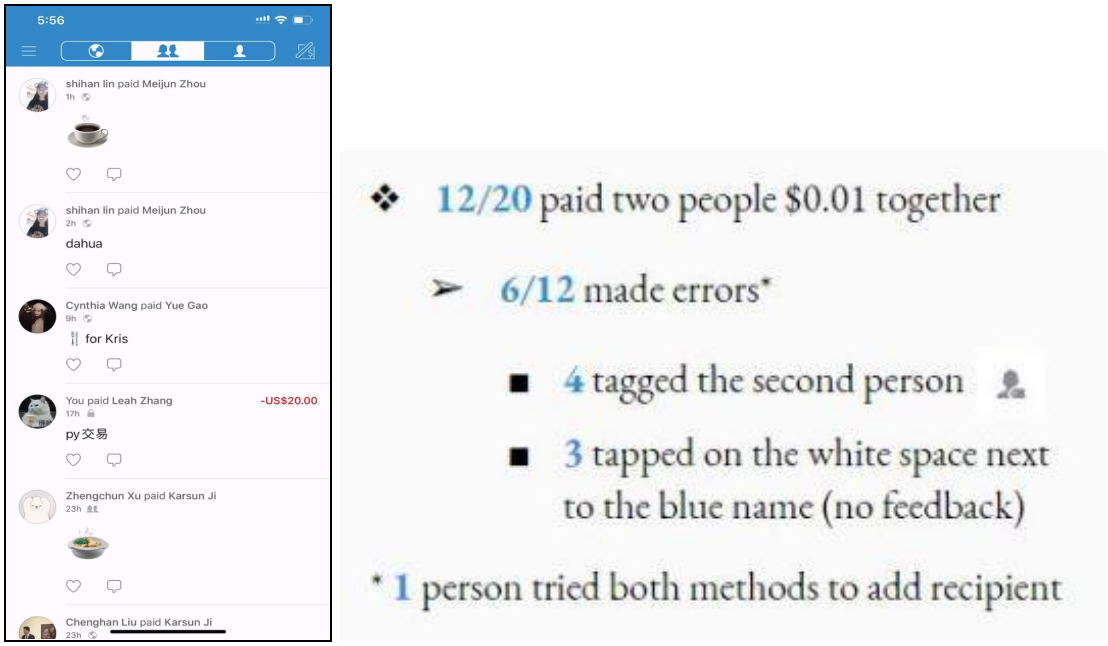


Figure 8: Problem #2 - Knowledge of Adding a Recipient to the Same Transaction

The second core ***problem*** is that out of our ***20 interviewees***, ***12 of them*** paid the two recipients together while the other ***8 interviewees*** paid the two recipients separately. After we made these ***8 people*** aware of the function to add a recipient in the same transaction and told them to execute the task, they all made ***knowledge-based mistakes***. We justify this from the fact that these ***8 people*** had the wrong ***mental model*** regarding how to pay two people the same amount of money each and their struggle to figure out how to engage with the function while executing the task.

Then, out of those ***12 people*** who had knowledge of the function, ***6 out of the 12*** still made ***errors*** when they tried to pay two recipients in the same transaction (**Figure 8**). ***4 out of the 6*** who made ***errors*** wrongly tagged a user instead of adding a user (**Figure 8**). Firstly, the icon of tagging a user is misleading and causes confusion. Also, users didn't know how to add a recipient properly due to the lack of a clear ***signifier***. ***3 out of the 6*** interviewees attempted to tap on the white space next to the initial recipient's name because in their ***mental model*** they believe that tapping on the white section should allow them to input the name of more recipients (**Figure 8**). For example, *Ethan3* explained that since in many apps like iMessage or Messenger you can add recipients by tapping on the white space next to the recipient's name, he thought Venmo would work like that too. These ***6 people*** who made these ***errors*** are classified to have made ***rule-based mistakes*** because even when they knew that the function of adding another recipient existed, they had the wrong ***mental model*** when they tried to add the

recipient and instead followed an inappropriate rule. The correct way to execute this function is to tap on the recipient's username in blue font to properly navigate to the page to add another recipient.

To clarify the breakdown of the errors above, as you can see, the numbers of the ***6 people*** who made errors adds up to seven because ***1 out of 8*** who made ***errors*** tried both of these incorrect methods but still received the incorrect ***feedback*** resulting in a frustrating ***experience***.

Core Problem 3: Setting a security password/PIN

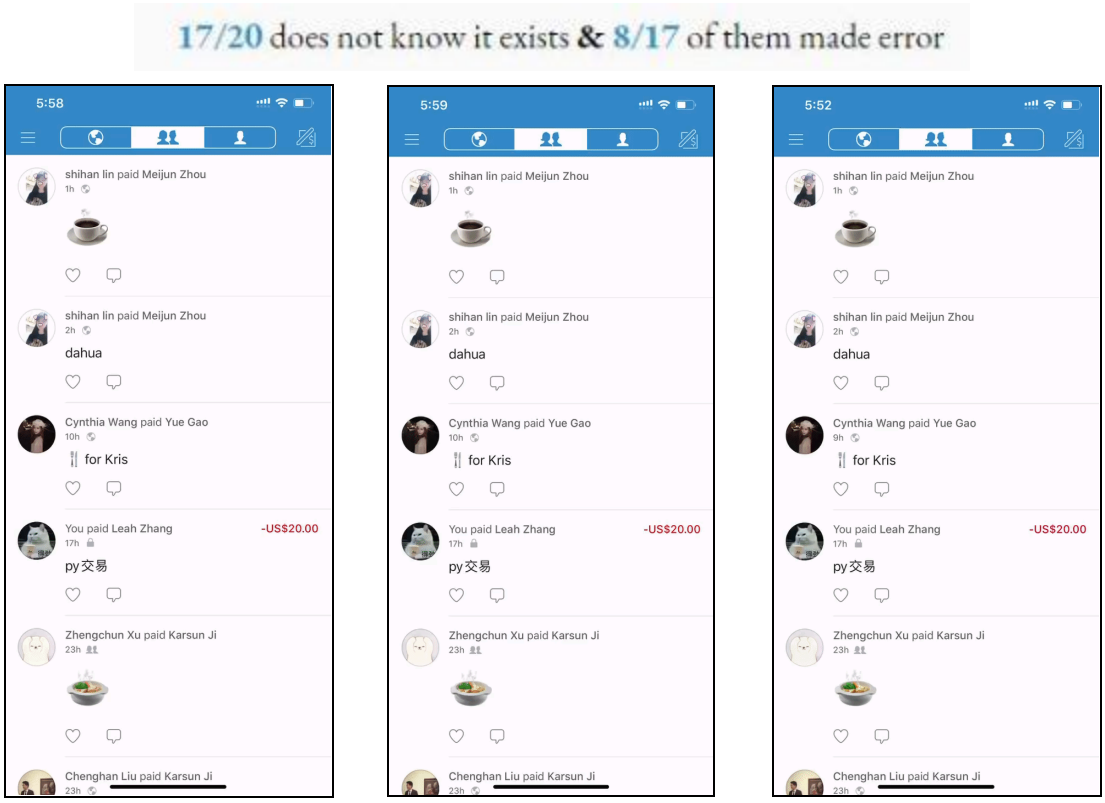


Figure 9: Knowledge of Touch ID & Pin

The third core ***problem*** is that ***17 out of 20 interviewees*** didn't know they can set a Touch ID and Pin for Venmo when we initially asked them. Then, when they were asked to try to do the task, ***8 of the 17*** made ***errors*** and ***5 out of the 8*** who made ***errors*** tapped "change password" and ***2 out of the 8*** tapped "privacy" instead of navigating to the correct location. These people who went to "change password" and "privacy" made ***rule-based mistakes***. The reason we believe that these ***errors*** are classified as ***rule-based mistakes*** is because the ***5 people*** who went to "change password"

executed the action that they personally intended but because they had the wrong ***mental model*** thinking that when we asked them to find the pin, they assumed that the pin is the password. We figured that this confusion resulted from unclear ***signifiers*** which can understandably lead users to think that the password is the pin when the password actually refers to the “account password”. Then the ***2 people*** who tapped into privacy to find the location of the pin setup also made a ***rule-based mistake*** because although their approach was logical, they still had the wrong ***mental model*** because the pin setup was under “security” not “privacy”. This again is due to unclear ***signifiers***.

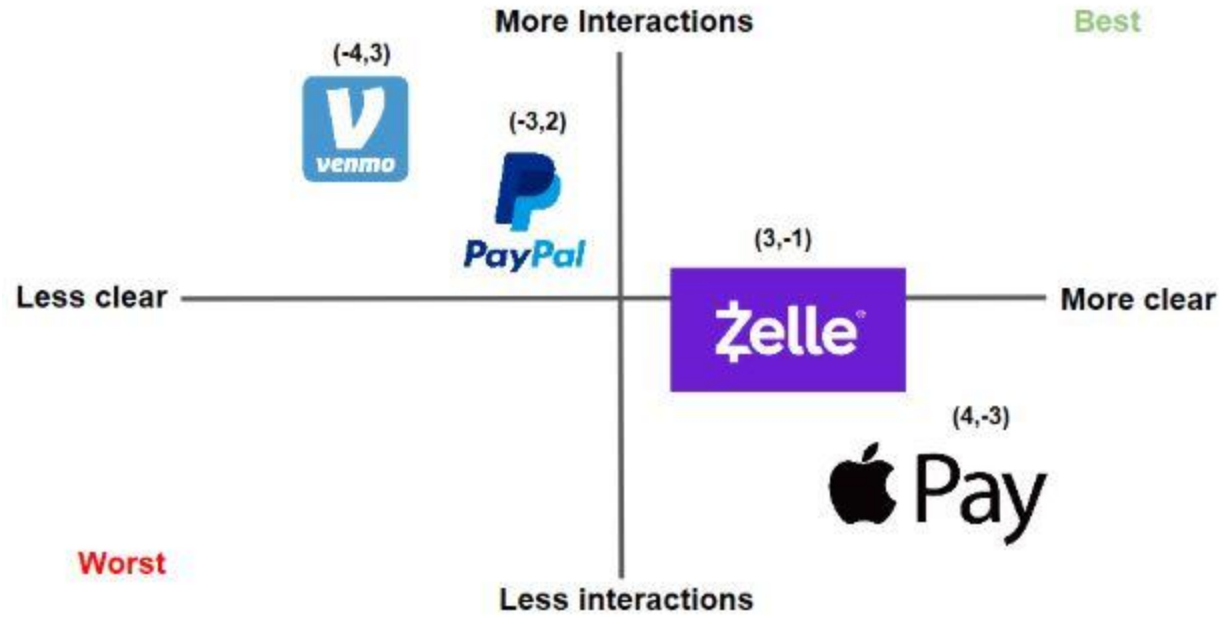
Finally, the remaining ***1 out of the 8*** who made errors went to their profile and tried to find the function there (**Figure 9**, left to right respectively). This displays a ***knowledge-based mistake*** because the interviewees had an entirely incorrect ***mental model*** when attempting to find the function and because this interviewee had no prior knowledge that this pin function existed. From this, our group gathered that the categories in the Venmo settings are obscure and causes confusion. The reason we felt that this is a core ***problem*** is because most users keep their Venmo account logged in which indicates that if someone else knows how to access the user’s phone, that person can open the Venmo app and pay themselves money. Therefore, to prevent a negative ***experience*** and trust issues with the Venmo app, we decided to call this out as a core ***problem*** and focus on it as part of our ***redesign***.

Problem Significance

Upon examining the core problems, we converged upon a single ***problem statement***. We realized that the underlying cause of all three of our core problems is the ***lack of clear signifiers*** regarding Venmo features. This is significant because the lack of clear ***signifiers*** reflects a ***system image*** that poorly bridges the user ***gulf of execution and evaluation***. As apparent in our data analysis, unclear ***signifiers*** often led to our interviewees making ***errors*** that can largely be prevented by a better design with clearer ***signifiers***.

Design Space & Redesign

Current Design Space & Tradeoffs



	Clarity	Interactions
venmo	-4	3
PayPal	-3	2
Zelle	-1	3

Pay	-3	4

Figure 10: Design Space - Clarity v.s. Interactions

Figure 10. shows our current ***design space and chart.*** It compares the various paying apps based on two features: clarity and interactivity

The clarity axis describes how well users are aware of/understand how to use the different functions throughout the app. A high clarity score indicates that the app has clear signifiers in its functions. This in turn closes the ***gulf of execution*** and reduces the time it takes for users to try and figure out how something works, helping to prevent users from making ***mistakes*** and unnecessary ***slips***. A low clarity score indicates that the app has many functions and features that are obscure or confusing, often creating a ***gulf of execution*** and a poor system image that does not bridge the designer's mental model with the user's well.

Figure 11: *Apple Pay* Paying Interface

In the current design space, *Apple Pay* has the highest clarity because it very clearly shows what users need to do to pay another and it does a great job explaining how to use its functions. As **Figure 11** shows, *Apple Pay* has clear signifiers as to showing the user how to pay. The credit card signifies to users that the current interface acts just like a credit card, with an icon below demonstrating the orientation of how the phone should be placed near the *Apple Pay* reader, with words “Hold Near Reader” to guide the users who do not understand the icon. ***Clear signifiers*** and descriptions like these appear throughout *Apple Pay* so we gave it a high clarity score, a model which our team will use to guide us through our ***redesign***. *Zelle* and *PayPal* are a little more complicated than *Apple Pay*, but they are still more clear on how the app and icons work compared to *Venmo*, so they are on the right side of *Venmo* on the ***design space***.

The interactivity axis describes how versatile an app is in terms of features. A higher interaction score means that there more interactions available between the user and the app from the larger variety of features the app offers. It is often better to have more interactions as having different available app features enables an app to cater to a wider variety of audience. A higher interactivity score generally guarantees users a better time on the app as there are more things to do (is it more fun to stalk friends on Venmo or stare at your lonely payment history on Apple Pay?).

Venmo has a high interactivity score because it offers users the unique interaction of adding friends and seeing your friends transaction activities. *PayPal* and *Zelle* sit somewhere in between Venmo and *Apple Pay* in terms of functions offered. *Apple Pay* receives the lowest score for interactivity because it functions basically like a digital credit card combined with some numbers on the bank statement, and not much more.

Clarity and interactivity are ***tradeoffs*** because having more of one usually means having less of the other. Because having more interactivity means having more functions and features, an app usually becomes more complex as designers try to fit all these tabs and icons into the app. Therefore, the clarity of interface often decreases in the process as it is harder to distinguish one feature from the sea of features. Having more features in an app also makes it more difficult and more time consuming for app designers to examine *every* detail, causing the designers to sometimes overlook making everything clear for the user a priority. In addition, having more tabs and icons also increase the chance that users confuse one with another, especially if the app ***lacks clear signifiers*** differentiating one from the other. It is ideal to have both, however, so this brings us to our ***redesign***, where we would try to keep the same amount of interactions on Venmo while improving the clarity of the app in general.

Redesign

For our ***redesign***, we focused on solving the problems in Venmo caused by ***unclear signifiers*** — the recurring theme of our core problems. The goal of our ***redesign*** is to improve the clarity of these current unclear ***signifiers*** on Venmo by making existing

signifiers clearer or adding new ***signifiers*** in places that lack them to let users know where to find certain features or how to use specific functions.

Our redesign can be broken down into three parts, and each part into smaller parts. They combine to provide solutions to the three core problems.

Redesign Part 1.1

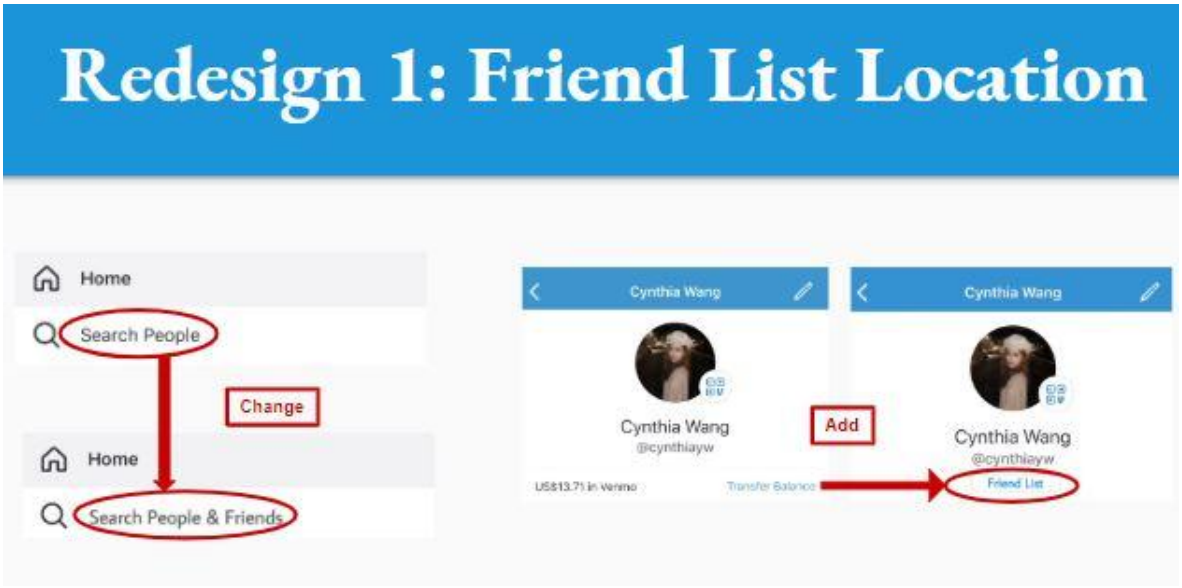


Figure 12A: Redesign - Location of the Friends List in Venmo

This ***redesign*** focuses on the friend list location within the Venmo app. Since ***9 of our interviewees*** had trouble locating the friends list because either they had no idea it existed or it was not located in a place that matched their ***mental model***, we decided to focus our first redesign on that. Initially, we changed “search people” to “search people and friends” because there were a lot of users who didn’t know the friend list is located under “search people” (**Figure 12A**). This change will improve user ***experience*** by decreasing frustration when they see the clear ***signifier*** of the “search people and friends” text. Then, we added a “friend list” icon on the sidebar menu just under their username to help users find their friends due to the reason that users can view other users’ friend lists on those users’ homepages but can not check their own friend lists on their homepages (**Figure 12A**). This addition can be more in line with users’ ***mental models*** because it makes the friend list location more evident and reasonable.

Redesign Part 1.2

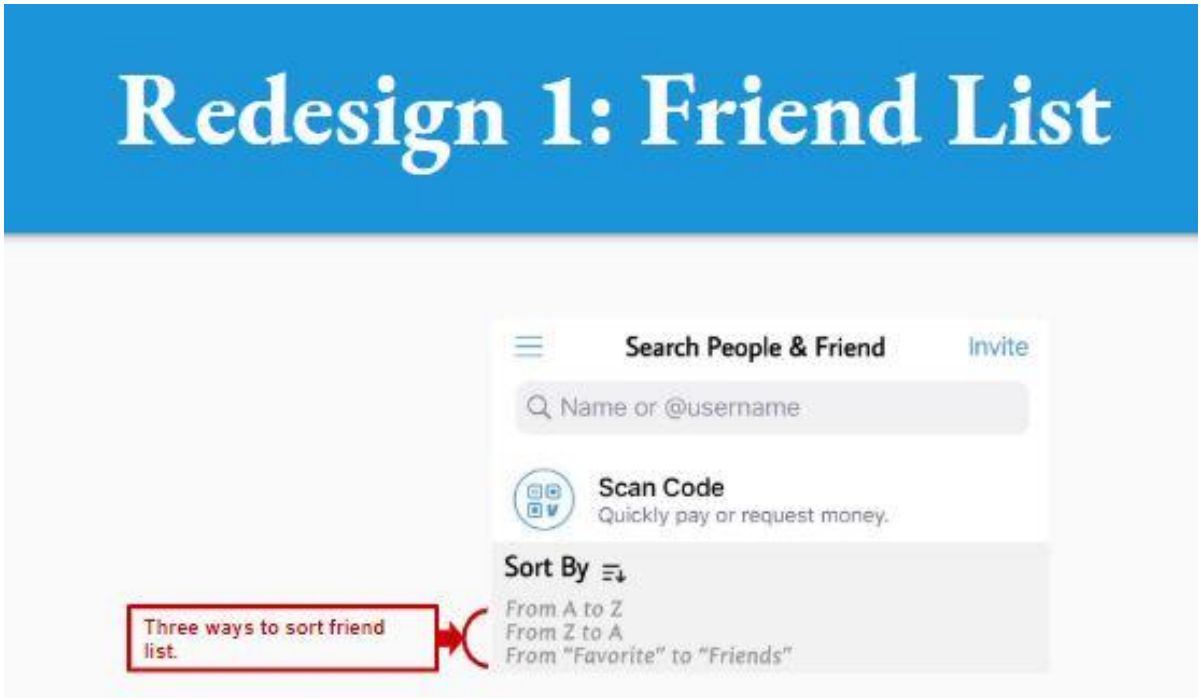


Figure 12B: Redesign - Friends List "Sort By" Function

This ***redesign*** is related to the friend list itself. Originally, the friend list of Venmo consisted of two parts, "top people" and "friends". "Top people" are those friends or other users who users have frequent transactions with, and they are sorted automatically into "top people" by Venmo's algorithm. On the other hand, "friends" are sorted by the length of time they have been friends with the user. These automatic sorting mechanism may lead to users' dissatisfaction, and it's difficult for them to locate their friends, resulting in a negative ***experience***. Therefore, we added a new feature called "sort by", which ***affords*** users three different options to sort their friend list (**Figure 12B**).

Redesign Part 1.3

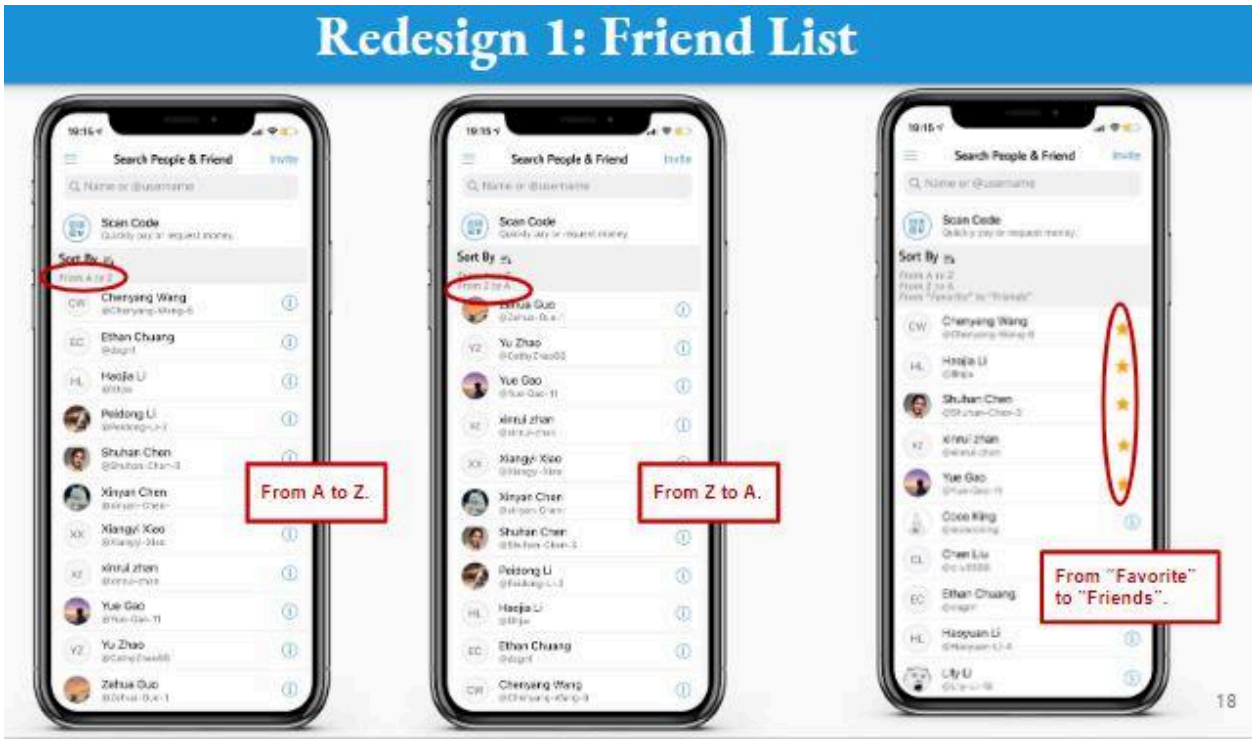


Figure 12C: Redesign - Friends List Details & Examples of "Sort By" Features

Here are the three choices we decided to implement into this new "sort by" function: from "A to Z", from "Z to A", and from "favorites" to "friends" (**Figure 12C**, left to right respectively). All these three types follow alphabetic order, whether by regular order or reverse order. Besides, users can now select their favorite friends by themselves manually, and these "favorites" with yellow stars next to them will show up on the top of their friend lists (**Figure 12C**, right image). Our group believes that this new "sort by" function can really improve user ***experience*** with the Venmo app.

Redesign Part 2

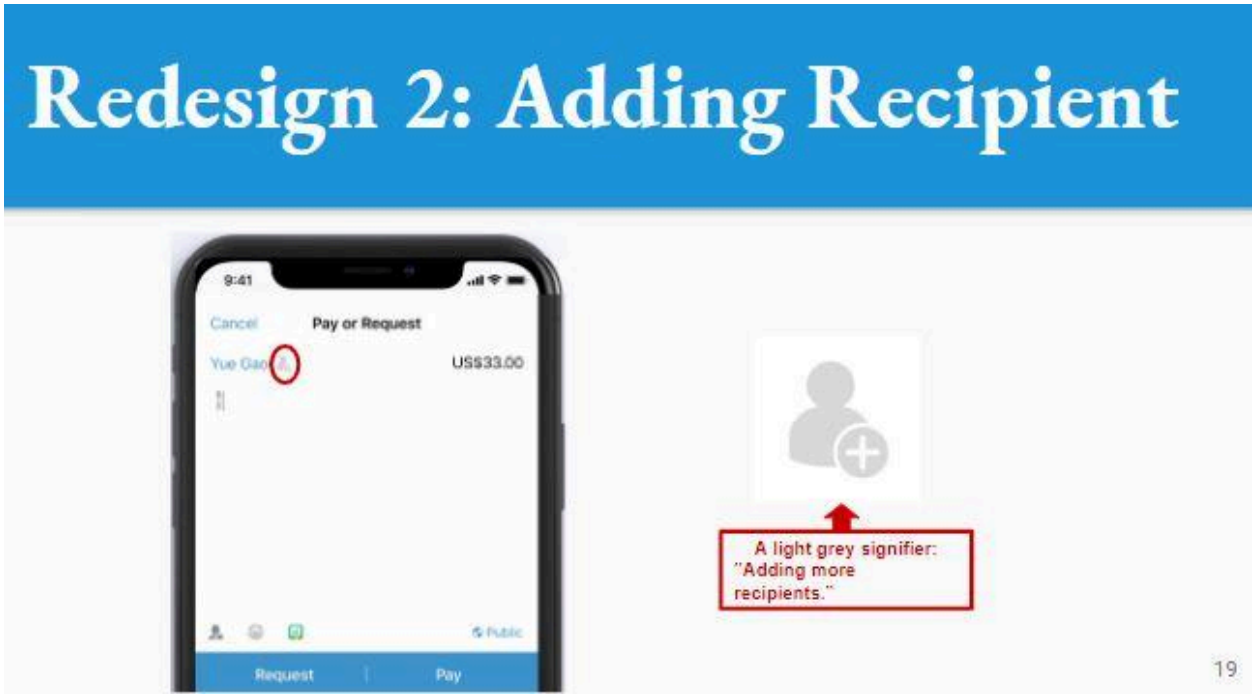


Figure 13: Redesign - Addition of Signifier for Adding a Recipient Within the Same Transaction

Our second ***redesign*** covers the ***problem*** of the lack of knowledge of adding recipients to the same transaction, which we felt has a pretty straight-forward solution. Venmo originally has the design that people can add multiple recipients through tapping the name of the existing recipient. Since there was no previous ***signifier***, there are plenty of users who don't know they can add multiple users to pay within the same transaction. For instance, ***12 of our interviewees*** paid two people the same amount of money separately, and ***half of them*** made errors, whether tagging another person or clicking the white space next to the blue username. Therefore, we simply added a light gray ***signifier*** to let users know that they can pay more than one user within the same transaction by tapping this icon (**Figure 13**). Adding this signifier improves user ***experience*** because now it could potentially take less steps to pay two or more people the same amount each.

Redesign Part 3.1

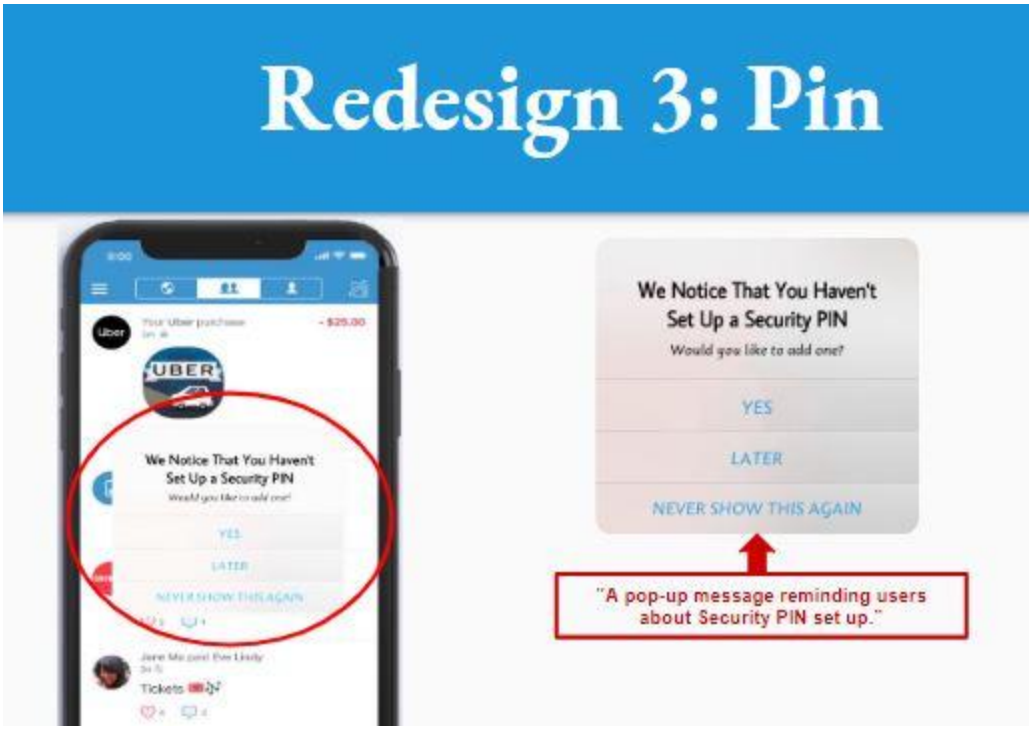


Figure 14A: Redesign - Pop-Up Notification Reminding User to Set Up a Security Pin

Our third and final ***redesign*** is about the Touch ID and Pin. Since ***17 of our interviewees*** didn't know the existence of setting a pin for Venmo, and ***8 of these people*** made errors, whether by pressing change account password or going to privacy settings, we created a pop-up message reminding people to set up a PIN when they enter the app (**Figure 14A**). They are then ***afforded*** three choices: yes, later, and never show this again (**Figure 14A**). We specifically chose a pop-up notification because we know that we have made it the clearest ***signifier*** that we could make it and if the user chooses to not want to see the message ever again, we will know that they made a conscious decision to do so and that has nothing to do with whether the ***signifier*** is clear or not.

Redesign Part 3.2

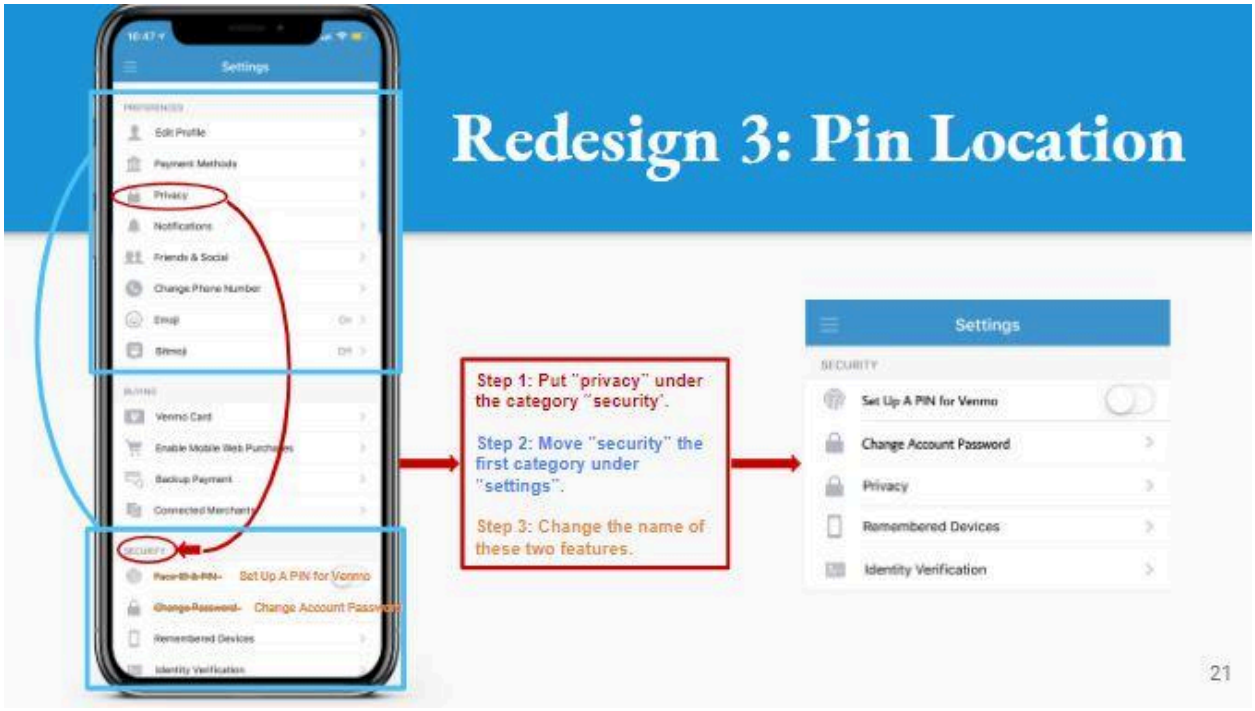
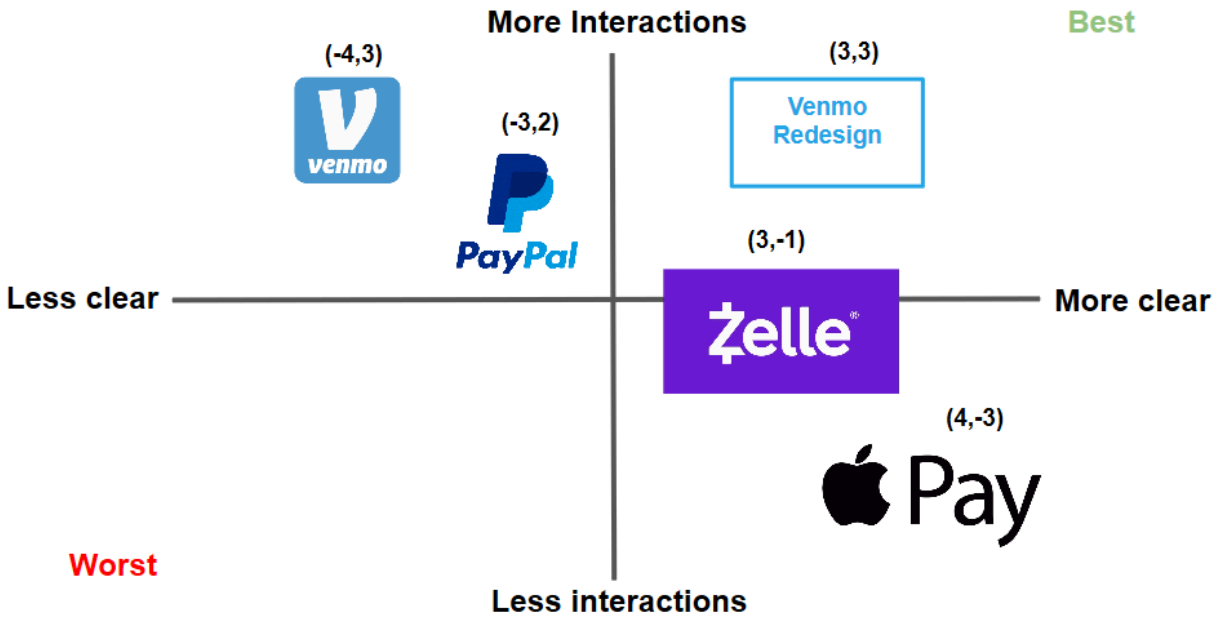


Figure 14B: Location of Pin Setup

According to our ***redesign*** of the pin location displayed in **Figure 14B**, there are three steps we decided to take to clear up **signifiers**. The first step is putting “privacy” under the category “security” to prevent mistapping, since ***2 of 8 interviewees*** who made ***errors*** went to privacy settings (**Figure 14B**). The second step is moving the entire “security” category up to be the first category under the settings, so that it will be more clear and convenient for users to ***discover*** and set up a pin (**Figure 14B**). The last step is changing the “Face ID and PIN” to “Set up a PIN for Venmo”, and changing “Change Password” to “Change Account Password” (**Figure 14B**). These two changes can help users ***understand*** the difference between PIN and password. The pin is a security measure for when users want to open their Venmo app, and the password is for logging into users’ Venmo account. These three steps wrap up our goal for clearing up unclear ***signifiers*** and improving the user ***experience***.

Design Space with Redesign & Tradeoffs



	Clarity	Interactions
venmo	-4	3
PayPal	-3	2
Venmo Redesign	3	3
Zelle	-1	3
Pay	-3	4

Figure 15: Design Space with Redesign - Clarity v.s. Interactions

The new ***design space*** mirrored the current ***design space*** with the exception of the addition of ***redesigned*** Venmo. The interactivity score of the ***redesigned*** Venmo remained the same because we did not add additional features or functions to Venmo. Instead, we improved on the clarity of Venmo features, thus moving up the ***redesigned*** Venmo further right and to the positive of the clarity axis.

By implementing our ***redesign*** parts 1 to 3, we greatly enhanced the clarity of the functions of locating a friend from the friend list, adding a recipient during a transaction, and setting up a security PIN. However, the ***redesign*** also comes with new ***tradeoffs***. One of the new ***tradeoffs*** associated with our ***redesign*** would be compactness. The ***tradeoff*** compactness in this case describes how "crowded" an interface feels to the user. More compactness would impact the overall "clean" feel to the screen. For example, by changing "search people" to "search people and friends" in ***redesign*** part 1.1, we improve clarity of the friend list but the increase in amount of words in the sidebar makes the entire interface look more crowded, wordy, and less aesthetically pleasing. Another example of how we ***tradeoff*** compactness for clarity would is by adding the "add recipient" icon in our redesign part 2. By adding the new human head icon, the white recipient bar loses its overall white uniformity.

However, our team believes that the minor loss in aesthetics and compactness would be well worth it when the clarity of certain features of Venmo are largely improved. Furthermore, these minor changes in visual can be quickly adapted to by the eyes of the user. Some may even find them more useful than bothersome.

Former Redesign Ideas

Here is a former ***redesign*** of the friends list:

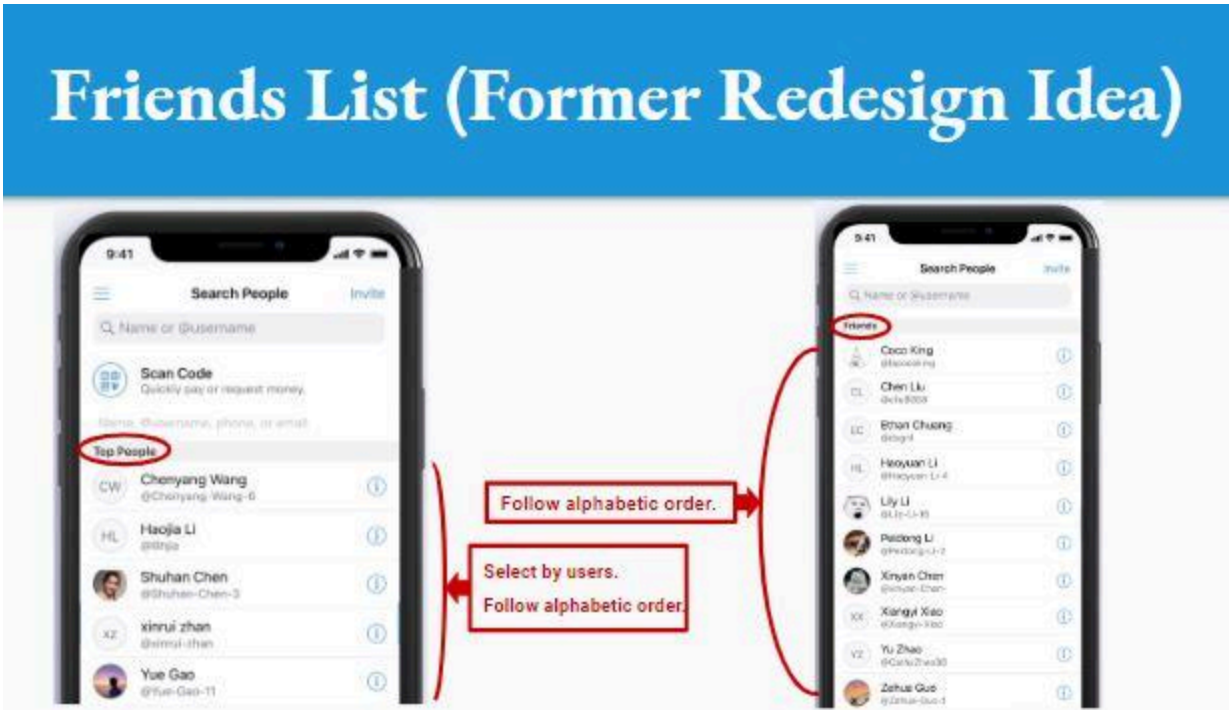


Figure 16: Former Redesign of the Friends List

Our first former ***redesign*** of the friend list includes two new features. The first one is “all friends” on the friend list follow an alphabetical order, whether they are under “top friends” or “friends”. The second one is users can select their “top friends” by themselves. However, since most of our team members are Chinese, a lot of our friends’ names start with letters at the back of the alphabet, so we later added a new sorting method which sorts the names from Z to A. Furthermore, compared to this former ***redesign***, our final ***redesign*** put a yellow star beside each “favorite” friend to make favorites more distinct. In conclusion, the reason why this initial design of the friends list was scrapped was because we felt that it still contained unclear ***signifiers*** in the sense that nowhere on the former ***redesign*** does it ***afford*** the ability to sort in alphabetical order because of the lack of ***signifiers***. We also felt that we could make a better redesign that will better improve user ***experience*** by inputting clear ***signifiers***.

Next, here is the first former ***redesign*** of the security PIN:

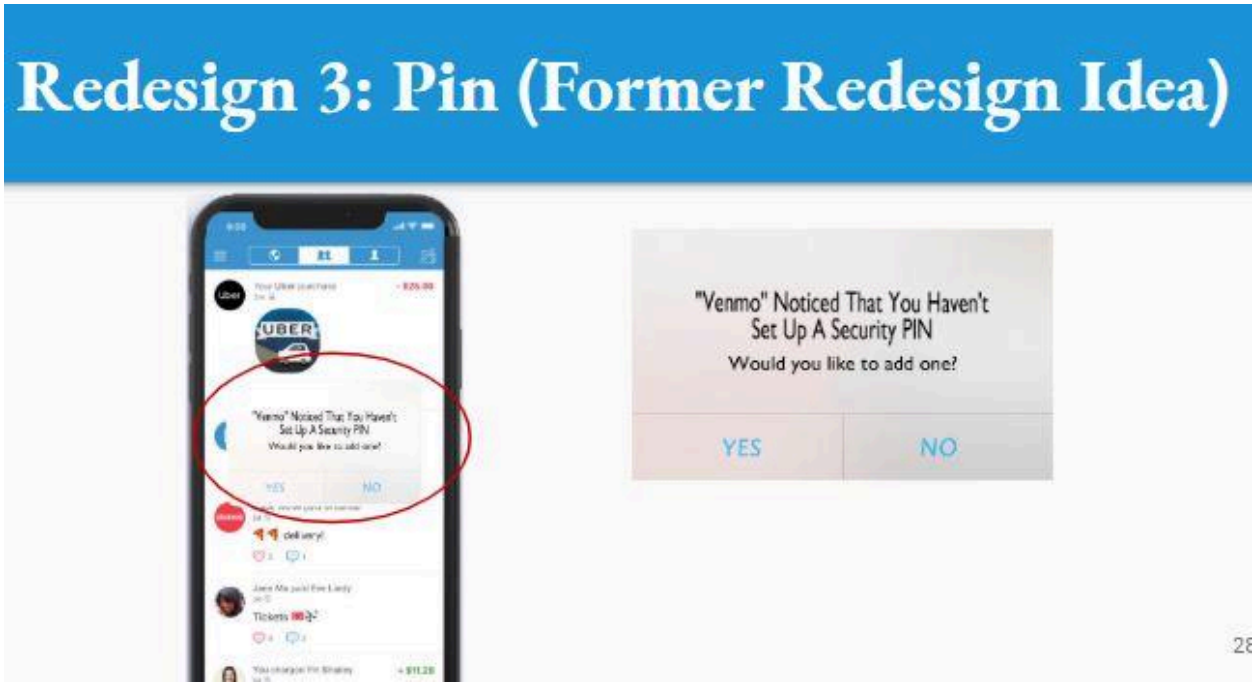


Figure 17A: Former Redesign #1 of the Pin

Initially, we only designed two options for our first former ***redesign*** of the pin (**Figure 17A**). However, after a long group discussion, we discovered a ***problem*** that some users may be willing to set up a pin but unwilling to set up a pin right now, so we changed “no” to “later”. Also, for those who don’t want to set up their pins and see this pop-up message, we offered them an option naming “never show this again.” This former ***redesign*** is more incomplete and less reasonable compared to the final ***redesign***.

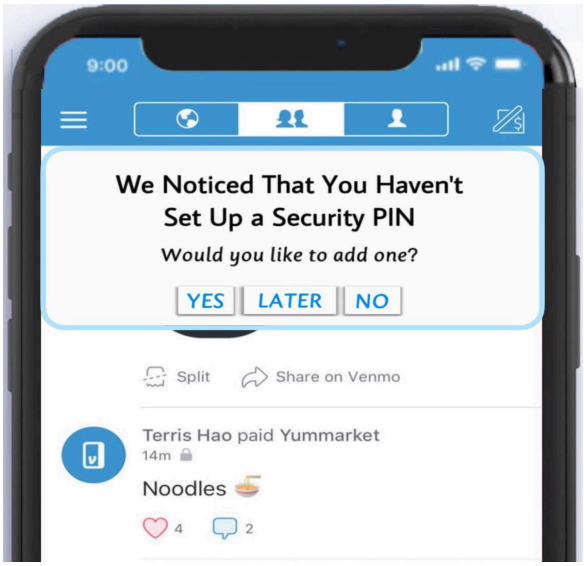


Figure 17B: Former Redesign #2 of the Pin

We actually came up with another former ***redesign*** for the pin and we really debated between this one and the final ***redesign***. One of our group members came up with the idea that instead of an “in your face” pop-up notification like we eventually chose to do in our final ***redesign***, he suggested that we put that same notification except in a banner style attached right underneath the homepage icons as displayed in **Figure 17B**. He argued that this will create a better user ***experience*** because users who don’t want to make a decision right away can choose to ignore the message until they want to respond to it. This former ***redesign*** also allows users to be able to use other functions of the app while the notification of the pin setup is still present, further supporting the claim of the better user ***experience***. This banner was designed to stick to the top of the homepage and will not move even while the user scrolls down to look through their transaction history.

The reason why we chose in the end not to use this ***redesign*** is because the rest of our group felt that it was fine to sacrifice potential user annoyance and in return gain user awareness of the pin and eventually security of their app. This was admittedly a close second to our final ***redesign*** but eventually it was scrapped as we felt that since our goal is to create clear ***signifiers***, it makes sense to have a pop-up notification that is right in the user’s face instead of a notification embedded within the homepage that users can simply learn to ignore.

Prototype

Our ***prototype***'s development went through many changes. Our initial ***prototype*** consisted of the combination of our former ***redesign*** ideas (friend list and pin) and part 1.1 of the current ***redesign*** ideas. However, after further discussions and debates among team members, we came up with our final ***prototype*** design consisting of a Venmo app combining ***Redesign*** Parts 1-3 described in the ***Redesign*** section, with ***Redesign*** 2, 3.1, and 3.2 replacing the former ***redesign*** ideas. In addition, we added ***Redesign*** Part 1.2 and 1.3 to enhance the user ***experience*** by improving the clarity of the friend list. The Former ***Redesign*** Ideas section describes the alternative ***redesign*** ideas that we eliminated and our reasonings behind their elimination.

The ***prototype*** we came up with was the result of an iterative process as it was chosen from the pool of ***redesign*** ideas we came up with. To pick out which ideas our team want in our ***prototype*** and which to eliminate, we had to constantly go back and forth between the ***problem and solution space*** of the ***Double Diamond Model of Design***. When two conflicting ***redesign*** ideas are present (such as the one mentioned above about banner vs. popup to let user know they can set a security PIN), our whole team discussed with each other the ***tradeoffs*** associated with both designs, choosing the ***redesign*** idea that best addressed the ***problem*** associated with the current design. In the case of the banner notification vs. popup notification redesign, our team ultimately chose the popup style because the ***problem*** lied in users not knowing they can set a security PIN, and a more urgent popup style notification will solve that ***problem*** better.

Conclusion

Summary of Our Findings

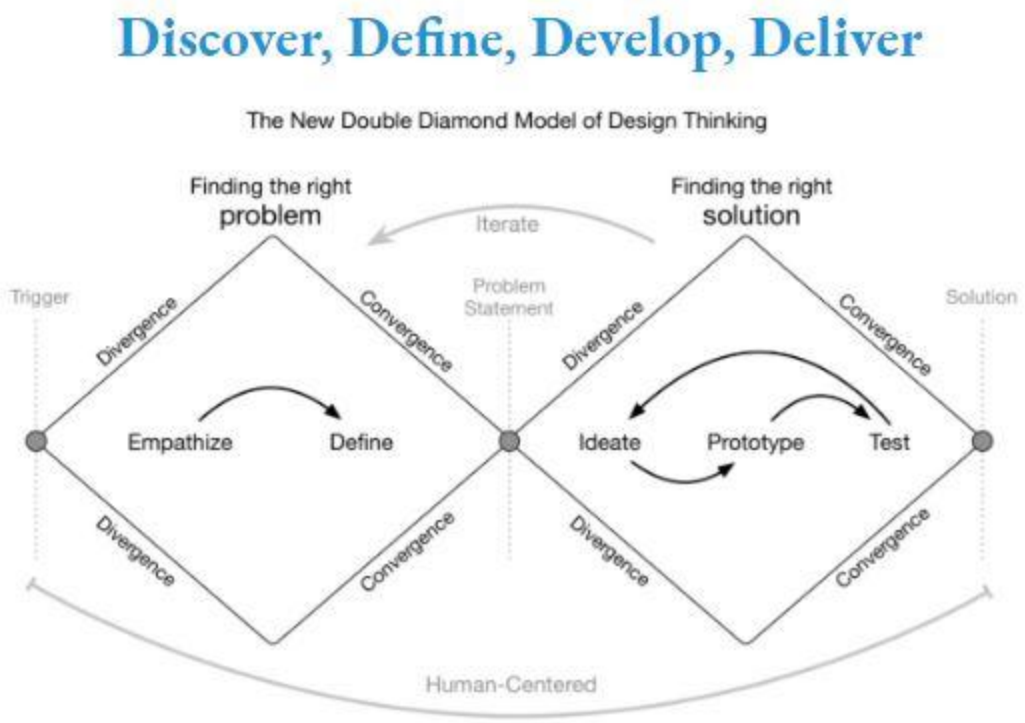


Figure 18: Double Diamond of Design

The ***Double Diamond Model of Design*** guided us through the Final Project. From the initial ***brainstorming*** stage, we applied to ***divergence-convergence*** aspect of the ***Double Diamond*** to expand our potential project idea pool to 17 ideas, eventually narrowing it down to one single idea. After deciding upon Venmo, we began ***brainstorming*** interview questions based on our current frustrations with the app. We came up with an initial set of interview questions and did a test run of interviews. Upon realizing that it may not yield sufficient insights to the problems on Venmo, we explored deeper into the different functions offered by the app. With the help from studio critique and multiple office hours, we came up with a revised question set that improved on the organization, wording, and quality of the initial interview questions. Our team members conducted a combined total of 20 interviews and took comprehensive and detailed notes on each of our interviewees.

We organized our data and ***discovered insights*** into potential ***problems*** of Venmo based on the many identified ***errors*** users made throughout our interviews. This point

served as the transition between the ***divergence*** and ***convergence*** process of our ***problem space*** in the first ***Diamond***. We examined the ***errors*** users made and boiled them down into three core ***problems*** — locating a friend on the friend list, adding multiple recipients to a transaction, and setting a security PIN — based on the number of errors users made in performing these tasks. Eventually, we ***converged*** upon a single ***problem*** that we identified as the ***root cause*** of our core ***problems***, which is the lack of clear ***signifiers*** throughout Venmo. Without clear ***signifiers***, Venmo often failed to convey when certain functions exist or how to use them.

Once we defined our ***problem statement*** and the area to focus upon, we entered the solution space and started ***brainstorming*** about potential ***redesign*** ideas. Every team member actively participated in the ***redesign*** ideation process, with members sometimes entering fierce debates with one another over which ***redesign*** idea is the best for Venmo. We eventually came up with a prototype of ***redesigned*** Venmo, combining 3 ***redesign*** ideas that tackle each three of the core ***problems*** we identified in our ***problem space***. During the ***redesign*** process, our team constantly ***iterated*** through the ***Double Diamond Model of Design*** by going back and forth before the ***problem*** and solution space again and again to make sure we are coming up with the ***right design*** for the ***right problems***. We did this by cross-checking our ***redesign*** ideas with the ***problems*** identified and making sure the solutions we ***deliver*** will work in preventing users from making future ***errors***.

Next Steps

Aristotle had a famous saying, *“the more you know, the more you realize you don’t know.”* This saying certainly applies in design too. By diving deep into the Venmo app, we came across many more ***problems*** than we initially anticipated or were aware of. The next step for our project would be to look into other unexplored ***problems*** in our ***problem space*** and coming up with potential ***redesign*** ideas for them, since the process of designing is continuous and does not end here.

After ***trading off*** so much of our personal time to work on a DSGN 1 final project, we would of course hope to see our vision of a Venmo ***redesign*** and ***prototype*** become a reality. If we have the necessary funds and lawyers, we would perform user testing with our ***prototype*** and release an actual Venmo ***redesign***. Since that was unlikely, we would consider instead proposing our ***redesign*** idea or simply our ***problems*** identified to the Venmo app design team.

Project Critique

We received critique from 3 different sources and some more than once. These 3 sources included studio section, IA office hours, and the writing hub.

From the beginning of this project, we asked a lot of questions during studio section. We asked for advice on how we could focus our interview questions and how we could organize our slides. We even asked how we could best create our video. Our group felt that we gained a lot of different perspectives on these three parts of the project. Regarding the creation and refinement of our interview questions, we gathered advice from each other as well as our IAs and TA. Although we received slightly different feedback from each person, we used that to our advantage and combined the feedback and used it to improve our project. Where we were lost before, we made a bunch a breakthroughs with refining our interview questions, creating our video, making our slides.

Then, stemming off of the advice and feedback we received from studio section, we also went to office hours where we brought our work in progress interview questions and later on presentation slides to receive feedback on it and get a better idea of what is expected of us in these specific parts of the project. Here, we got one-on-one time with the IAs that we talked to in their office hours and they showed us examples of our work and clarified anything that we did not understand. Therefore, with the extra support of office hours added on to studio time to work together with our group members and ask for advice, we grew in a positive direction. We realized that all of this feedback that we were receiving and the way we responded to the feedback directly reflects the method of the ***Double Diamond Model of Design***.

Finally, one of our group members made an appointment with the writing hub and she brought our paper in to the tutor to receive final suggestions and refinements. We revised some grammar mistakes and worked on the consistency of the paper. We took the tutor's advice into consideration and made final edits before deciding that our project is complete. Here is a screenshot of the end of meeting email displayed below:

Project Timeline

11/13 Week 7 Studio
- Team formation
- Dining hall vs app for project
- Team contract

11/13 - 11/17
- Consult TA's during OH about project idea (physical spaces vs apps pros and cons)
- Make observations & brainstorm problems for phys spaces & apps
- ethan@wye, julia@anusha

11/17 first team meeting at geisel 2pm - 5pm
- Venmo as project idea confirmed
- Initial interview questions completed

11/17 - 11/19
- Interview test run, each member interview 1-2 people

11/20 Week 8 Studio
- Compare results for test run
- Consult TA/IA and ask for critique for our questions
- Coming up with modified interview questions
    - Make overall final interview questions more organized, wording more specific and less confusing
    - Avoid leading questions, yes/no, make questions open-ended

11/23
- Interview data completed

11/23 -11/25
- Interview analysis

11/27 Week 9 Studio
- Talk about slides
    - layout, organization, split up parts
- Talk about video
    - Create script
    - Create and edit video

11/29 -12/4
- Finished and turned in video and slides
    - Practiced presentation multiple times

12/4 Week 10 Studio
- Presentation

12/5 - 12/9
- Work on and finish paper

All errors

- #5 How you would add me as a friend
  2 people made error
    - 1 **knowledge-based mistake** (Doris 3)
    - 1 **memory-lapse slip** (Doris 2)
- #7 Locating friend in friend list
  9 made error
    - 9 people made **knowledge-based mistakes** b/c of wrong **mental model**
      - 5 profile
      - 4 homepage
      - 2 settings
      - 2 confused top people & friends
- #8 Show me how you would pay me $0.01
  1 made error
    - 0 made mistakes
    - 1 made **action-based slip** b/c he had the correct ***mental model*** but he simply typed in the wrong value but backspaced and typed it in correctly the second time
      - Entered 0.1 instead of 0.01
- #9 Show how you would pay two people $0.01 each.
  14 people made error
    - 6 of 12 who paid together made errors
      - 4 tagged the person (tag icon; **rule-based mistake**)
      - 3 tapped on the white space next to the initial recipient (blue name, **rule-based mistake**)
    - 8 of 8 people paid separately made **knowledge-based mistake** (did not know function existed)
- #11 Show me how you would change the privacy settings of a past transaction
  2 made error
    - 1 person made **knowledge-based mistake**(went to edit profile on own profile)
    - 1 person made **mode-error slip**
      - Pressed on globe icon by accident (meant to press the one head icon which is adjacent to it)
- #12 Show me where you would go to set your default transaction setting
  2 made error
    - 2 people made **knowledge-based mistake** (did not know where to go to change the setting)
- #13 Show me how you would block me
  2 made error
    - 1 went through settings (**knowledge-based mistake** b/c did not know where the function is)

        - 1 went to profile page but clicked “friend” status instead of the three dots on the upper right corner (**rule-based mistake**)
- #15 show me how you would set a password specifically for Venmo before opening the app (for those who know the function existed):
  0 made error
- #16 show me how you would set a password specifically for Venmo before opening the app (for those who did not know the function existed):
  8 people made error
        - 5 pressed change password in settings (**rule-based mistake**)
        - 2 went to privacy in settings(**rule-based mistake**)
        - 1 went to profile (**knowledge-based mistake**)