User Population

Beginning my cultural probe, I had to pick my participants carefully so I could get a large amount of quality information. My goal was to find out how people are splitting bills with their friends and how I can improve on that process with my own bill splitting application. I needed participants that were frequently eating out, going out, and splitting various bills with others to gather enough data in two weeks. I chose three male friends of ours from UW-Madison that consistently eat out, go out for drinks on the weekend, and split bills with their roommates or friends. To my benefit, each of the three participants had discussed with one of us previously how frustrating splitting a bar tab or restaurant bill was currently. All three participants owned iPhones, two used a popular payment service Venmo, and all three desperately wanted to make splitting bills an easier process.

Cultural Probe Design

The design of my cultural probe was intended to be as easy and un-intrusive as possible. I knew I needed to have my participants think about how they were splitting their purchases/bills right away and it couldn't be a long process. What I devised was a simple Google form that my participants could fill out after each task. The form asked a few basic questions such as the location/business where the bill split occurred, how many people were involved, the method involved, if a receipt was taken, and most importantly the frustrations that arose with the particular bill split. Only one of the questions was particularly open-ended, namely the frustrations my participant had, but all the other questions gave us the info I needed to see why and where those frustrations occurred. Importantly, this simplicity cut down on the time my participants had to spend on my form, which increased their response rate. To control quality, I knew it was important that my participants didn't feel that my form was a chore, so I advised to only fill it out if they had time and were felt they could give us a proper response. I could have missed out on quality data if my participants didn't feel like filling out the form, but I definitely cut down on the amount of "bad" data that could've been submitted if participants weren't interested in the process.

Data Analysis

To collect all of my data in one place, specifically an excel spreadsheet, was an easy process due to my probe's design. From the Google forms I were able to export all of the raw data quickly to the excel spreadsheet, which gave us a better look at all the data in one centralized document. Once I had all of my data in an excel spreadsheet it was easy to start seeing patterns of frustrations that

arose in various situations. Right off the bat I looked for frustrations that arose for all three participants, which would signal a recurring problem. I immediately saw frustrations that arose due to different preferred payment methods, sales tax issues, remembering cash repayments, and counting individual items from a receipt. These major issues represent the breakdowns that occur in my participants current splitting methods. Some of these problems I had anticipated, but one frustration I didn't consider was the difficulty of applying sales tax correctly to fairly split a bill. This is a prime example of an issue that would surely arise in my implementation had I not gathered data to alert us to this problem before I went to design my solution.

After looking at recurring problems that all my users experienced, I looked for edge cases where little insights could be gleaned from a specific user's situation. Looking at my "info" questions was particularly helpful here. I learned about a few payment methods I hadn't considered that could make my solution more inclusive and centralized. For example, one user had friends who wanted to use Chase Pay or PayPal while my user had Venmo. This led to an incompatibility and they resorted to using cash, which satisfied no one. Little issues like this were categorized as important additions to major features that could push users to fully adopting my application.

Lastly, before moving onto building my affinity diagrams and models I sat down with my participants to go over their data. I asked them to clarify some of their frustrations so that I could edit them to make them clearer. I talked about my solution ideas and received positive responses when I integrating their frustrations into usable solutions. It was important to them that my original idea was solid, but also that I specifically solved the issues that arose during their testing. These discussions allowed us to create my user stories based off my own participants experiences. With their data and input I focused on the recurring issues across all of my user's testing and took their own experiences as a model for my stories.

Work Models

Having all of my data in an excel spreadsheet was useful, but to pare down all that info into what I thought was most relevant required an affinity diagram. I categorized my affinity diagram by "issues" regarding receipts, payment methods, people/location, as well as flow ideas for my own solution. This allowed us to better structure my user data and add my own comments so I could easily build relevant models.

The physical model is just one representation of where users are able to use my solution to splitting bills. Users have the ability to use my bill splitting app anywhere they go to with friends for example: restaurants, bars, grocery stores, gas stations or even petting zoos. Most commonly

people will use it where the business won't allow multiple receipts so users are forced to find some way to later split their joint purchases.

Through the flow model I are able to see how users communicate with each other, discussing the best method of splitting bills. While analyzing the data from my diary studies I found this was where users were most frustrated. When large groups of friends are forced to pay with one receipt, things can get very complicated if not everyone has the same form of payment service. All of my users found themselves in this situation multiple times so trying to pay people back with cash resulted in a long and difficult process. Some people had to go to ATMs to get cash where there were fees involved, others only had large bills which required breaking down, and in all cases no one was able to pay the exact amount, someone always ended up overpaying. On the other hand when my users went out with people who all had Venmo the process and communication of splitting the bill was painless because everyone is able to pay exactly what they oI down to the cent in a quick and easy way.

User Stories

Ben and Jerry like to save time shopping by combining their items into one bill that they can split later. One trip to Walgreens; however, frustrated them when sales tax made splitting their bill difficult. Not only did they have to calculate it out across all of their items, but it made their bill difficult to payback due to the change required. This is almost impossible for them when they use cash, so someone always pays a bit more than their share. Fine for close friends, but awkward with others. Ben got Venmo to try to rectify the situation, but Jerry doesn't want to use Venmo, leaving them in the same situation. A simple way to quickly, electronically split the bill and keep track of past bills so they could even out their shares would be extremely effective.

James and his friends like to go out to the bars on the weekend and typically like to use just one credit card for their entire tab. This saves them time ordering drinks and not everyone has to wait at the bar to close out their tabs at the end of the night. However, the bills are usually quite long and it can be hard to split the bill on the spot let alone remember to pay that night. This leaves James sometimes paying for drinks he didn't get and chasing down his friends for their part of the bill the next days. James and his friends would like to keep using their system, but just fix the problems. A bill splitting app that allowed each user to see the receipt, claim their items, and pay in one location would make all of their lives easier.

Mike and his friends all have their preferred methods of payment such as cash, Venmo, PayPal, Chase Pay, and more. However, all these payment methods don't play too well together, which leaves Mike and his friends compromising on one payment method that not everyone wants

to use. Simply put, a centralized bill splitting application that allowed multiple payment methods to transfer money would solve Mike's problem.

Design Ideas

Focusing on the main frustrations are participants experienced I found three opportunities to improve their bill splitting process in my app. First, I would allow users to take a picture of the receipt that will use text recognition to itemize the receipt. This will allow a better interface for users to decipher the receipt for splitting and payments. Once the receipt is itemized, the receipt can be shared among the people who are splitting the bill, allowing each user to pick their items on the bill. This simple change takes pressure off the one person who typically has to split the bill and itemize it and allows the group to do it collectively. Lastly, once users have picked their items on the bill, sales tax will be applied to their purchases and users will then be able to pay back the original purchaser with one of the multiple supported payment methods. Allowing support for multiple payment methods will fix the recurring problem of payment incompatibility from previous bill splitting methods I observed.

Reflection

Conducting a cultural probe was a different experience than doing contextual inquiries. It was simultaneously easy and difficult. On one hand all I had to do was design the probe, find good participants, and let them gather my data for us. However, creating a probe that would work for both my participants and my own needs was more difficult than simply interviewing participants. Moreover, I needed participants that I could trust to truly participate when I weren't there, something that wasn't a problem in contextual inquiries. The data I received was similar to contextual inquiries, in that I could see a lot of it coming because I had thought of it ourselves. Still, as with contextual inquiries there was always data that completely surprised us and made us reevaluate my previous product beliefs. Luckily, I had no real need to make any changes to the probe while collecting data, but it could've easily happened. If I were to improve the process of cultural probes I would likely observe the actions I were testing before I built the probe in order to get a better understanding of what the best questions might be for data collection. Ultimately, I think probes are a powerful tool to gather data over a longer period of time for products that are just being developed.