

Memorandum

Date: April 24, 2023

To: Center for Campus Involvement
Student Organization Accounts Service

From: Taylor Scott, Engineering Honors Student

Dist.: Dr. Laura Hirshfield, Engineering Honors Capstone Advisor
College of Engineering Honors Department

Subject: Money Management & Transfer Mobile Application for Student Organization

Foreword

I personally have been an authorized signer for three student organizations during my undergraduate education. Being an authorized signer exposed me to the main pitfall of the current system – depositing cash or checks in-person. Many student organizations have circumvented this pitfall by using non-approved money transfer applications, such as CashApp, Venmo, Zelle, etc. As an independent project, I sought to prototype a mobile application that could be used internally within the University to transfer money to student organizations.

Summary

Before developing this application, market research was conducted through a survey to gauge if this application would benefit the campus community. This survey asked the two following questions among others: what percentage of people in the UM Ann Arbor community use unapproved money transfer applications for student organizations, and what features are needed to make CCI and SOAS trust a digital money transfer application? From the survey, the 2nd most used method to transfer money to student organizations was Venmo, an unapproved method. The majority of survey participants said they would use the mobile application proposed if developed. I started sketching pages for the application for both the individual user case and the student organization case. The individual user case allows students to select a student organization and choose one or multiple charge items before submitting payment, The student organization case allows the student organization to create or edit charge items that display when an individual user selects the student organization. The sketches were then used to create a UI/UX (user interface/user experience) design in Figma. After creating the design in Figma, application development began in Android Studio using kotlin. Troubleshooting current issues in Android Studio are the next steps of the development process. This application should be developed to improve the efficiency of money transferring to student organizations.

Introduction and Background

The Center for Campus Involvement (CCI) and Student Organization Accounts Service (SOAS) are the two university entities that monitor student organizations, with SOAS focusing solely on financial concerns. According to the documentation for student organizations on campus, student organizations are only allowed to collect payment via cash, check, or money order. That money must then be deposited at the Student Activities Building (SAB) Teller Services. There is no system in place to call and deposit money digitally. The current structure of transferring money to a student organization is extremely antediluvian as most students do not carry cash or checks. For this reason, many student organizations use Venmo, CashApp, and other facsimile money transfer apps to exchange money with students and vendors. This is technically not allowed because there is no guarantee that the person who creates up the account will transfer the money to the SOAS account, which must be done in person.

Because of this, there is a need to develop a mobile money transfer application that student organizations can use to exchange money with other students and vendors. This application would allow students to upload a payment method to send money to student organizations. For authorized signers (students that can sign for transactions) for student organizations, there would be the ability to change profiles between their personal account and the student organization account.

Methods

To successfully develop this application, I must first understand if this application is necessary. This will be gauged through a survey distributed throughout the UM Ann Arbor community. Once utility is confirmed, I will begin sketching the application which resulted in the modeling of the UI/UX design of the application in Figma. Lastly, I will take this modeling as a reference while I am coding the application. More details of each step in the process can be found below.

Market Research

Market Research was conducted through a Qualtrics survey. A portion of the survey isolated students that were leaders in student organizations to determine how those organization accepted payment from students. After the survey asked all participants how they personally transferred money to student organizations, students were asked about perception of using certain applications that are strongly discouraged (i.e. CashApp, Venmo, Zelle, etc.). Lastly, I asked participants if they would use an in-house money transfer application with SOAS oversight if developed as well as any features the application would need for user trust. This survey was distributed throughout the campus through GroupMe chats.

App Sketches

I made sketches to depict how the application looks from the individual student account perspective and the student organization account perspective. Both perspectives utilize bottom navigations to switch between the home, transfer, and profile pages. Initial sketches can be found in **Appendix A**.

Individual Student Account Perspective. The Home page displays two main sections. The first section displays how much money is in the app. Money can be added to the app via card or bank information. The second section is a list of recent transactions. Each transaction includes the organization name, the transaction reason or line item, and the associated dollar amount. Withdrawals will be in red text, and deposits will be in green text. The transfer page initially had 4 components. The first component is the student organization search bar. All registered student organizations will appear in the dropdown menu once the bar is clicked. Selecting an organization will population the second component, the possible charge items. These charge items are determined by each organization and will be explained in more

detail in *Student Organization Account Perspective*. The final two components included “Pay” and “Request” buttons to account for refund requests, a manual charge calculator, and the “Submit” button. After discussions with my faculty advisor, I simplified this page to only have the “Submit Payment” button as the selected reasons will auto-populate the total cost being paid and refunds can be processed through the student organization account perspective. Lastly, the profile page includes the logistics users would need manage the application. This includes linked bank institutions, settings, privacy & security, and account information. There is also a “Transfer” button on this page below the amount of money in the app to transfer money out of this application into the user’s linked financial institution. These sketches were then modeled in Figma to enhance the UI/UX design as seen in the *UI/UX Prototype* section.

Student Organization Account Perspective. The home page looks similar to an individual’s home page. The distinguishing component is that student organizations can have more than one project grant, or subaccount for different purposes. The top section will display how much money is in each of the project grants. The bottom section will include recent transactions, similar to the individual’s home page, but distinguish which project grant was involved in the transaction. The transfer page has two sections. The bottom section is a projection of the SOAS dashboard website which will link authorized signers to those pages. The top section is the “Manage Charge Items” button to manage the reasons for students to submit payment to the organization. Clicking this button leads to a page that lists the current existing charge items with buttons of the bottom to edit those items or create new items. There will also be the option to have price matrices according to date from event or the capacity of the event. The profile page has the following sections: account information, linked project grants, action required, settings, and privacy & security. The action required section will be activated if SOAS needs the organization to update any charge item or if more information is needed to process a request.

Android Studio Implementation

Android Studio was selected as the platform to develop this application because of its accessibility and lengthy in-house provided documentation. Android Studio primarily uses Kotlin and Java to program the application. There are two main file types of a project, the application, in Android Studio. One file type is xml. This is where you create the features you want to use and store variables in mass. For example, my text lists are stored in the string.xml file. The other file is kt. This file reads in user input and alter the features created in the xml file based on user input. Android Studio also has base application templates. Because I knew I wanted to have bottom navigation for this application, I selected the bottom application template. After this, I focused on creating the transfer page for the individual user. I am currently focusing on the condition where the user selects the National Society of Black Engineers as the student organization for money transfer. To do this, I created two spinners, dropdown menus in Android Studio, and a checkbox list. The top spinner is present on all pages of the application. This spinner toggles between an individual user and a student organization to indicate what perspective is being shown. The second spinner is a list of student organizations. Note: This is currently a fraction of the registered student organizations at the University as this app is meant to confirm proof of concept. The checkbox list is for each charge item the user may select. Those checkboxes trigger the calculation of the total cost the user is paying which is displayed at the bottom of the transfer page before the “Submit Payment” button. The home and profile pages are currently set up as text pages.

Results

This section includes my results from the Qualtrics survey that I launched as well as the initial snippets from the Figma UI/UX prototype and Android Studio versions of the application. Further discussions about improvements to the Android Studio application will be presented in **Next Steps**.

Market Research

The Qualtrics survey was launched in February 2023 and closed in March 2023, and there were 71 participants. Of those, approximately half were or have been student organization leaders. **Figure 1** displays the results of isolating current and former student organization leaders when determining how organizations receive money.

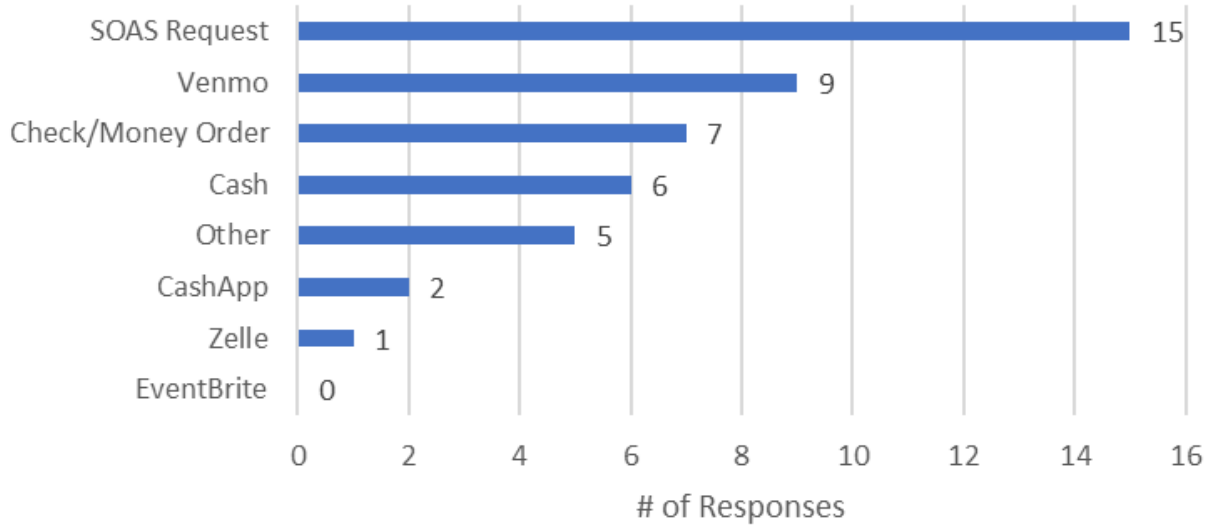


Figure 1. Responses to “How does your organization transfer or receive money?”. Only participants that indicated they were or have been student organization leaders were asked this question. Multiple options could be chosen.

The 2nd most used method reported by student organization leaders was Venmo. Both check/money order and cash, the approved ways for students to give money to student organizations, were used less frequently. “Other” included applications like GreekBill, which manages funds for Greek organization chapters, and external bank accounts, which are also not advised. Note: SOAS Requests are used for student orgs to send payments but also to transfer money between student organizations.

All participants were then asked about how they personally transferred money to student organizations. **Figure 2** displays these results.

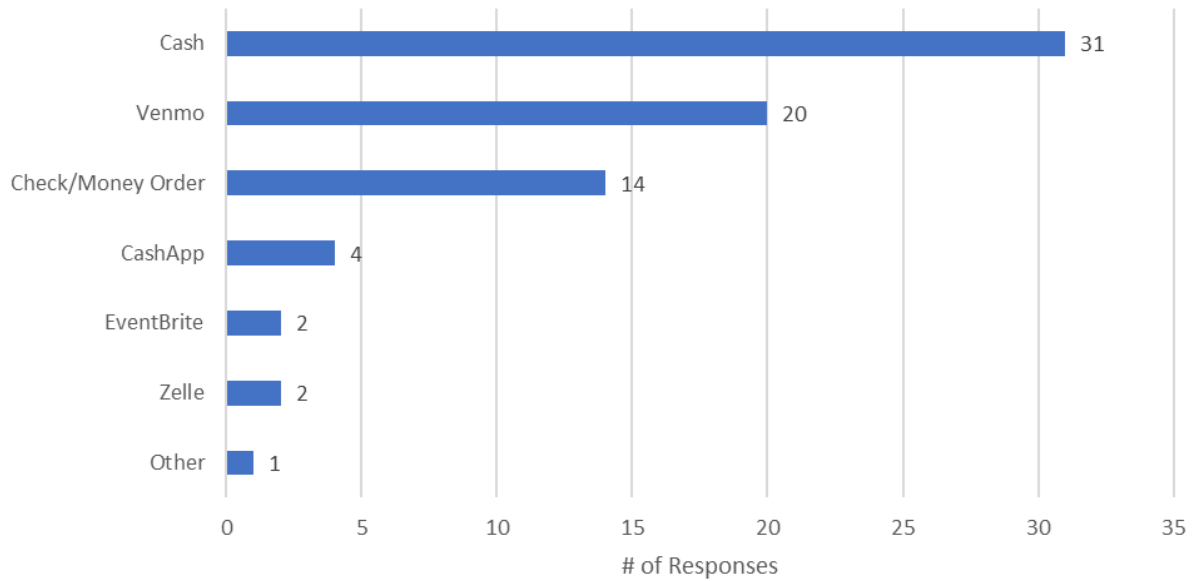


Figure 2. Responses to “How do you personally transfer money to a student organization?”. Participants could choose multiple options.

Similar to results shown in **Figure 1**, Venmo was the 2nd most used method to transfer money to student organizations. This establishes that Venmo is understood both within and outside of student organization leadership as an effective payment method. “Other” also referred to GreekBill, which was mentioned previously.

After gauging how common money transfer applications are used by student organizations to collect money from students, I provided context that SOAS does not permit methods for students to give money to student organizations outside of cash, check, or money order. After contextualizing, I asked participants if they were concerned about student organizations using non-approved methods anyway. The results are included in **Figure 3**.

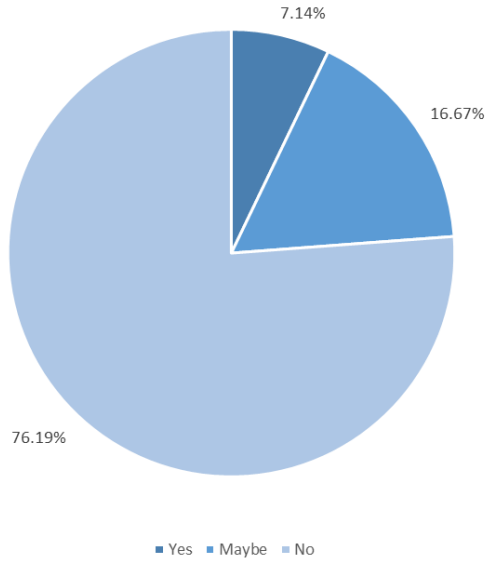


Figure 3. Responses to “Are you concerned about organizations using these payment methods?” after mentioning digital transfer applications were not approved by SOAS.

Majority of participants (76.19%) said that they were not concerned about organizations using these methods. There was a follow up section that allowed participants to explain their previous vote. The most common reasoning was that these methods did not seem less safe than cash and these methods were more convenient with their student lifestyle. Note: Participants also mentioned that concerns were raised after telling them these methods were not approved.

I then asked participants if they believed SOAS should reconsider approval of other methods to transfer money to student organizations. The results are shown in **Figure 4**.

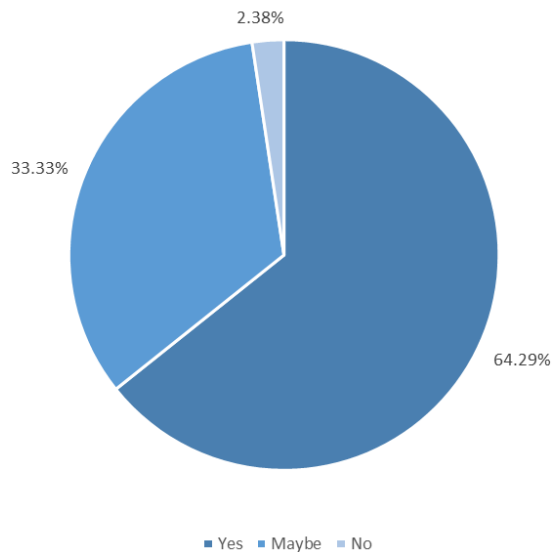


Figure 4. Responses to “Do you believe SOAS should reconsider allowing student organizations to collect money via money transfer applications?”

Majority of participants (64.29%) said that SOAS should reconsider allowing these methods to transfer money to student organizations. There was a follow up section that allowed participants to explain their previous vote. Comments restated efficiency of using digital money transfer applications; other comments expanded to include how auditing would be an integral part of using money transfer applications.

After posing these questions, I offered an alternative: an in-house application with SOAS oversight that would allow students to transfer and receive money digitally from student organizations, similar to the non-approved digital methods. The results from the question used to gauge if participants were interested in this alternative are in **Figure 5**.

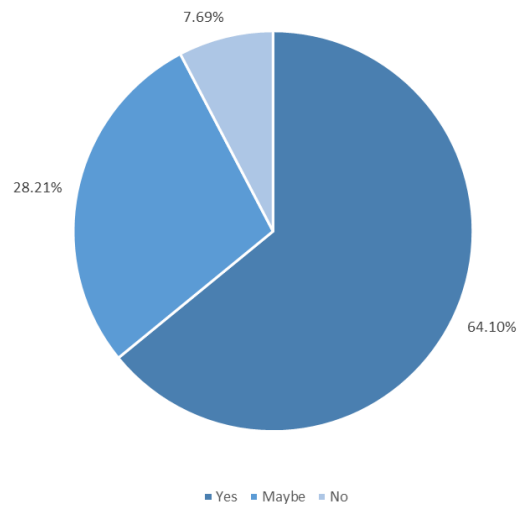


Figure 5. Responses to “Would you use this application if developed?” after introducing the concept of an in-house money transfer application for student organizations.

Majority of the participants (64.10%) said they would use this application if developed. There was a follow up section that allowed participants to explain their previous vote. Affirmative comments included that this application would be easier for both students and student organizations to use. Negative comments included that the introduction of another application that acts similarly to what is already on the market would be cumbersome.

The market research clearly indicates that non-approved methods are used with high frequency between students and student organizations when compared to approved methods. Additionally, the research shows that my application would be favorable if introduced into the market of college campus.

UI/UX Prototype

Taking the preliminary sketches mentioned in *App Sketches*, I started designing the UI/UX prototype in Figma using the Android template. My first priority was to develop the transfer page for individual users. **Figure 6** shows the proposed mapping from searching for an organization to seeing the charge items associated with that organization.

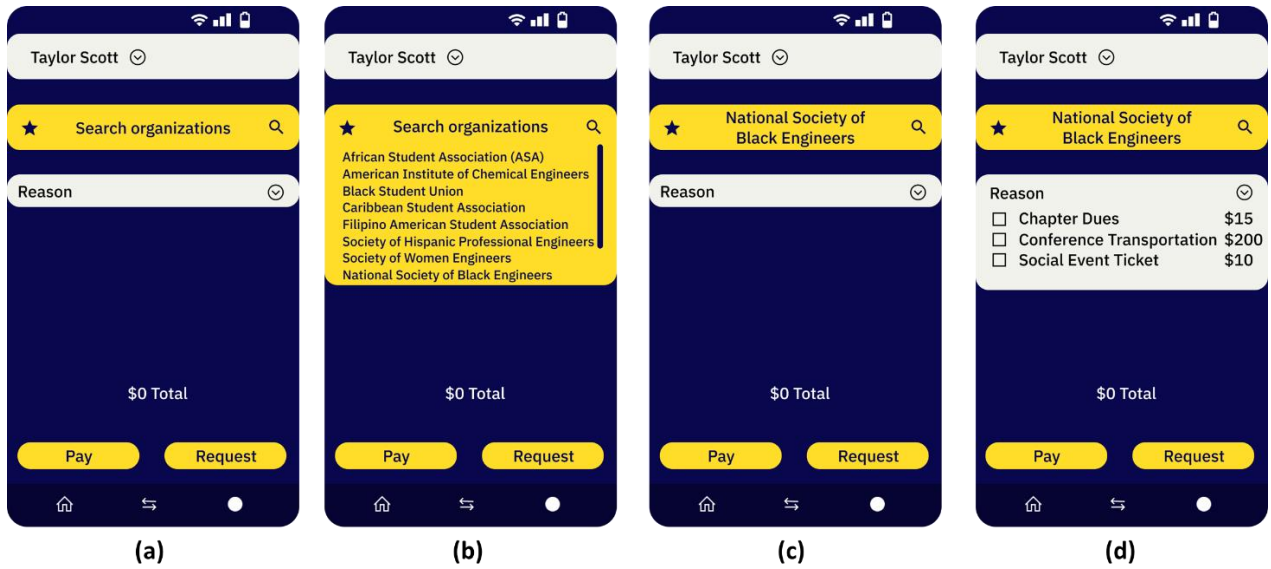


Figure 6. Prototyped mapping from searching for organization to selecting charge items.

In Figma, the magnifying glass was clicked in **Figure 6a** to open the dropdown menu with student organizations. After clicking the desired student organization in **6b**, that student organization is displayed in the yellow search bar in **6c**. Finally, clicking the down arrow in the “Reason” search bar in **6c** will prompt the charge item dropdown menu to appear. **Figure 7** below shows one possible combination of clicks resulting in the total cost for the transaction.

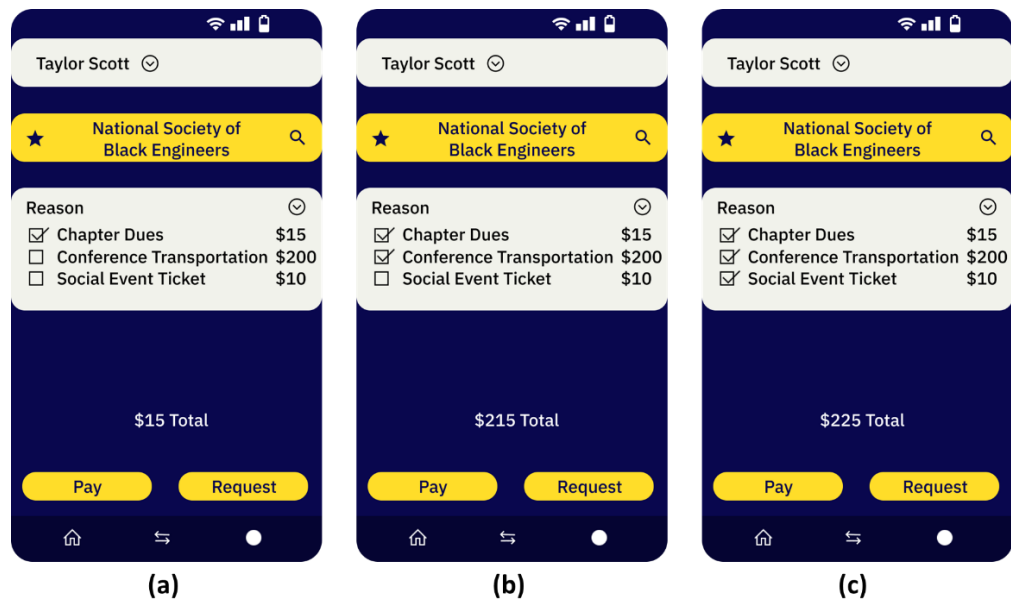


Figure 7. Possible click mapping for these charge items.

This mapping assumes that “Chapter Dues” are selected before “Conference Transportation”, which is selected before the “Social Event Ticket”. Checking the box of each charge item adjusts the total amount

seen at the bottom of **Figure 7a-c**. As timing became limited on my project, my capstone advisor and I agreed that I should devote the remainder of my time to developing the application, seen below.

Android Studio Implementation

I was able to make progress on the home and transfer pages from the individual user's account. **Figure 8** shows the design mockup of these pages, respectively. For both pages, the features – spinners, text, checklists, buttons – were first introduced in their respective xml files, `fragment_home.xml` and `fragment_dashboard.xml`. In these xml files, I had to put vertical and horizontal constraints on each feature to lock the features onto the page. I have encountered several issues with generating this application in Android Studio, which I will detail in **Next Steps** for future development.

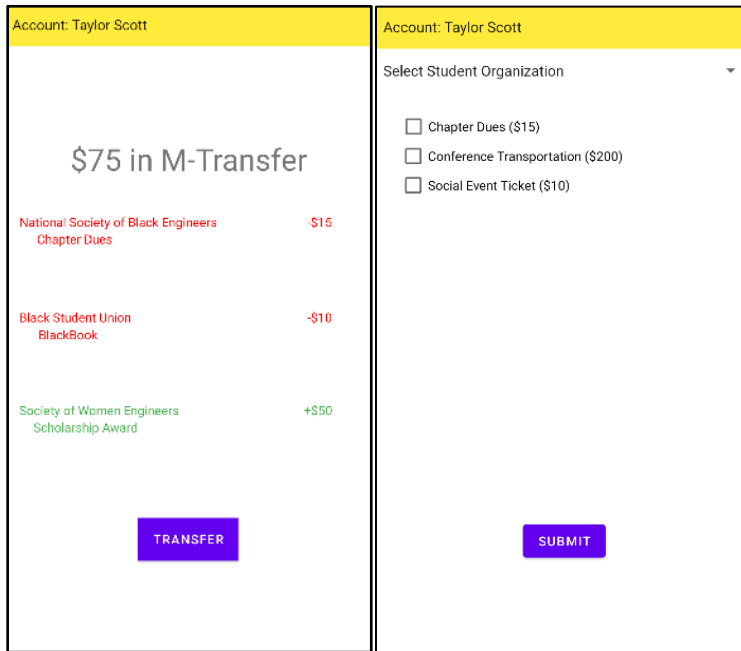


Figure 8. Home and transfer pages produced in Android Studio, respectively.

Videos of the functionality of the home and transfer pages from the individual user perspective can be seen in **Figures 9** and **10**, respectively.

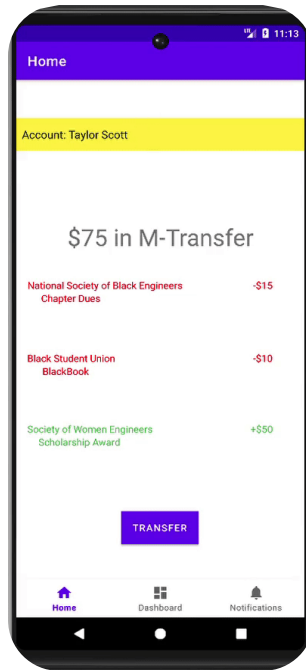


Figure 9. Home page from individual user perspective.

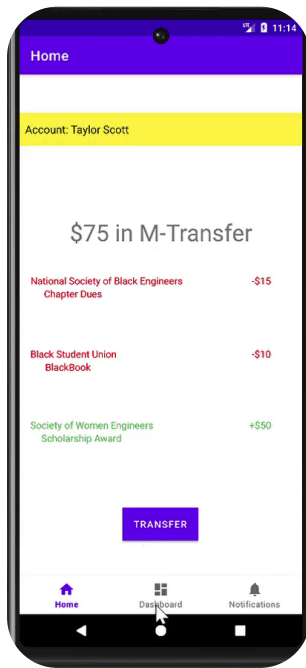


Figure 10. Transfer page from individual user perspective.

Next Steps

The next steps are to overcome the following issues in Android Studio: design mapping to individual devices and kt file displaying. In **Figure 8** above, the first spinner, which controls the account being displayed, is attached to the top of the screen. However, when modeling this application on an actual device, the first spinner is not flushed to the top of the screen (see **Figures 9** and **10**). This is despite the line of code that should align the spinner to the top of the parent screen.

The most prominent issue is displaying the user interface actions written in the kt files. The kt file contains the code that is responsible for altering other components based on user input. Here are the following cases that rely on the kt file code:

- “Select Student Organization” spinner should only appear if the account spinner is “Account: Taylor Scott”.
- The charge item checklist should only appear if “National Society of Black Engineers” is selected on the “Select Student Organization” spinner.
- Clicking checkboxes in the checklist should automatically prompt the calculated total to recalculate.

As mentioned previously, there are many Android Studio templates for applications. One template is the basic composable template. Most of the documentation for application response to user input is for the basic composable template. As I used the bottom navigation template, it is difficult to isolate the differences between the two templates that is resulting in lack of response to user input.

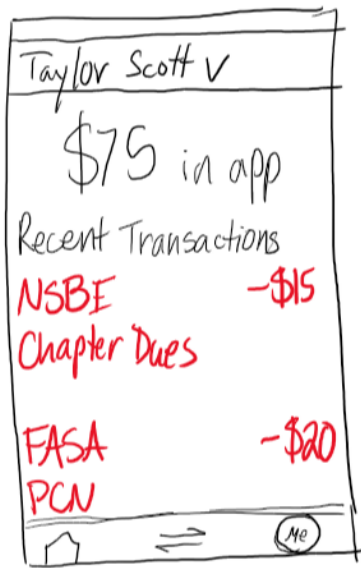
Further research needs to be conducted to resolve both issues before attempting to create the student organization perspective of the application. After that is completed, the “Submit Payment” button should result in a charge being deducted from the home page under transactions to ensure the application is in sync on all pages. Troubleshooting is an iterative process; however, based on the market research and positive response I have received from community members, I believe these next steps should be taken to further the development of this application to eventually roll-out to UM Ann Arbor students and student organizations.

Conclusion

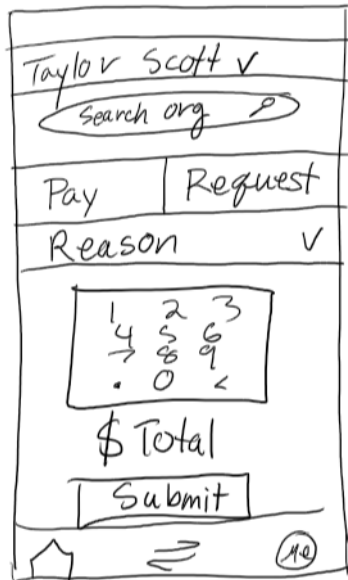
Non-approved methods are used frequently to transfer money to student organizations, indicated by survey results. The survey also indicated that participants would use an internal to the University application to transfer money to a student organization if developed. After sketching and prototyping the application by hand and in Figma, respectively, application development began in Android Studio. Continuing development of the application in Android Studio involves troubleshooting the current issues. After resolving these issues, a user experience test panel should be conducted to determine other features for the application. This application would benefit both students and student organizations if developed.

Appendices

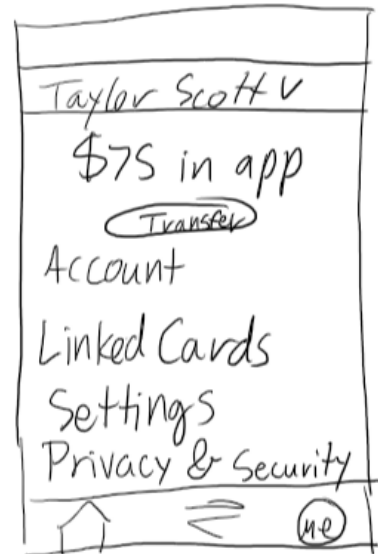
Appendix A: Preliminary Sketches



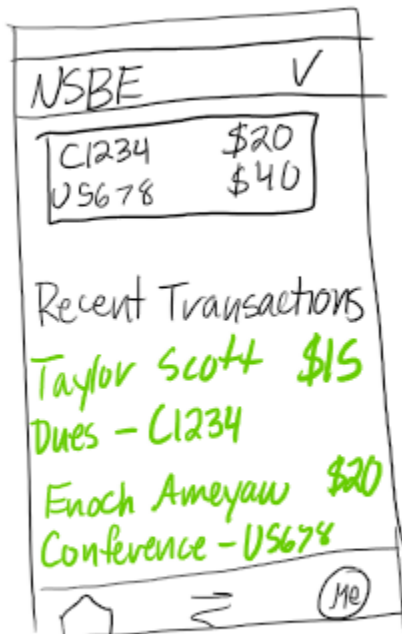
Home



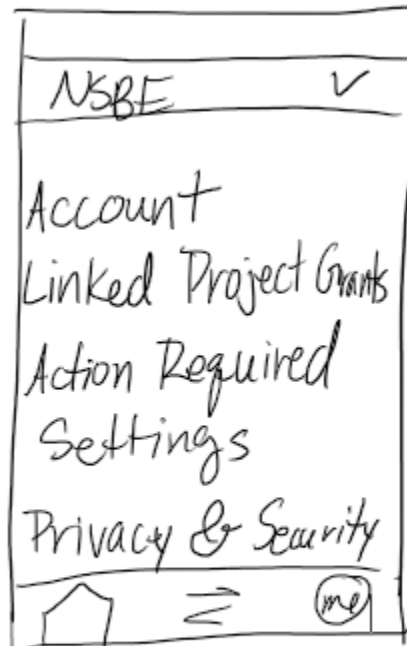
Transfer Page



Profile Page



Home



Profile Page

NSBE	✓
Manage Charge Items	
<div style="border: 1px solid black; padding: 5px;"> SOAS Finance Dashboard Purchase Request Form Request Bank/Bag L&A Room Res Substitut w/ payments over 10K </div>	

← scroll



NSBE	✓
← Manage Charge Items	
Chapter Dues \$15 Conference Reg. \$200	
Edit	Create New

Transfer Page