

A Usability Evaluation of Money Transfer Apps in the United States

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1 Introduction

Mobile money transfer applications have disrupted digital banking trends. The increased use of money transfer applications like PayPal, Venmo and Cash App has been largely attributed to the ease and convenience that they offer users to send money. According to a 2022 Pew Research, approximately 6 in 10 Americans have used one of these apps at any one point [10]. In addition to convenience, 47% of those who have used these apps indicated that a key reason for using them is because they make sending money to people safer.

While these apps offer convenience, mistakes such as sending money to the wrong recipients remain among the most common reported sources of distress and customer service requests [1, 4, 5]. Additionally, users generally cannot remedy their mistakes since transactions are instantaneous and it is legally impossible to cancel transactions after they occur [4].

The causes of user mistakes when using these money transfer services are unclear. In this study, we hypothesize that usability challenges contribute to user mistakes for both novice and experienced users. We would like to find ways to improve the user interfaces of money transfer services to prevent users from making mistakes. To do so, we need to understand when and why users make mistakes. We therefore explore this through the following questions:

1. What usability problems are present in current money transfer app interfaces?
2. How do real-life conditions such as being in a rush or having an interruption while using money transfer apps impact the likelihood of user mistakes?

3. How can money transfer interfaces be re-designed to reduce user errors and increase usability?

We explored these through a 10-participant within-subjects study that allowed us to observe user actions in error-prone environments. Our results show participant errors during the recipient entry process, and in the presence of distractions. We propose design recommendations to help address the usability challenges we observed.

2 Background and Related Work

Given the importance of usability in user satisfaction with technology, we build on previous work that show the importance of usability elements in the use of technology [2, 11]. Kuan found that “Add Recipients” and “Pay or Request” were the most frequently used buttons on Venmo [6]. However, while they evaluate the Venmo interface based on some pre-determined measures, they do not conduct an in-depth usability study. Rastari et al., analyzed the usability of banking apps and concluded that their low adoption was attributed to poor usability [8]. Similarly, Munoz-Leiva et al., established the impact of ease of use on mobile banking apps [7]. Another study revealed that users prefer fewer links and smaller navigation trees [9] while Zhang and Adipat proposed generic guidelines on how to conduct such usability studies for mobiles [12]. In designing to minimize user errors Budde et al. emphasize analyzing user errors to adopt appropriate interfaces that help prevent them, while not introducing too many constraints that frustrate users [3]. To our knowledge, however, no studies have conducted an in-depth evaluation on the usability of money transfer apps in the United States.

3 Methods

We conducted an in-person within subjects user study to examine the cause of potential mistakes in the use of money transfer apps in a simulated mobile money transfer environment. All participants were from the US and had to have

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interacted with money transfer apps before. We recruited 10 participants between the ages of 19 and 29 through flyers on the Carnegie Mellon University campus (Appendix 1). We ran two cycles of the user study, each with five participants who were compensated with a \$10 Amazon gift card. The protocol was approved by the CMU Institutional Review Board.

Prior to conducting the user study, we analyzed the designs of the Venmo and PayPal money transfer applications using cognitive walkthroughs that simulated the workflows of these applications. Following these walkthroughs, we identified three areas of the current mobile money transfer interfaces that would likely be most susceptible to user errors: selecting a recipient from among those with similar display names, selecting a command (pay or request) using two similarly-formatted option buttons, and confirming a transaction using an interface with limited transaction details.

Based on the cognitive walkthroughs, we created two prototypes based on the PayPal and Venmo interfaces using Figma. This allowed us to mimic screen transitions and allow basic interactivity to simulate the money transfer processes in a safe but realistic way. We designed tasks to allow us to observe participants going through typical processes under diverse conditions: (a) general (b) rushed (c) manipulated situations (we changed participant input as if they had clicked the wrong button to see if they noticed the change. This was intended to simulate situations where users unconsciously make a mistake) and (d) distracted conditions (Appendix 2). The order of tasks was randomized to minimize learning effects.

We asked participants to think-aloud as they completed the tasks and we audio-recorded them. We also screen-recorded their actions as they completed the tasks. Participants used a smartphone that had been dedicated by the researchers for the study. This was necessary to maintain their confidentiality especially because we needed to screen-record their actions. The experiments were approximately 45 minutes long.

After completing all assigned tasks, participants were interviewed about their experiences with the tasks and with money transfer applications. We asked different questions depending on whether or not the user had made a mistake to elicit potential reasons for the mistakes from their perspective. Using the findings from the first cycle, we designed new prototypes (Appendix 3) to address the main issues we discovered. The new prototypes introduced the following new features: a new confirmation page that displayed all the transaction information on one screen, new command formats, a warning notification where the user had similar name recipients, and a recall feature. We tested these new prototypes with participants in cycle 2 who completed similar tasks as in cycle 1.

We analyzed the number and type of mistakes for each task. From the think-aloud scripts and post-experiment qualitative data, we conducted inductive coding. This was done by one coder with the rest of the researchers acting as reviewers to validate the results. Given that this was only a pilot study, future research should consider a larger and diverse sample.

4 Results

In the first experiment cycle, we found participants performed similarly using the Venmo and PayPal interfaces (Appendix 2). For those tasks that did not involve any special difficulty, mistakes were unlikely to occur even with time constraints. However, for tasks that had recipients with similar names (i.e., A2, B2 and C1) participants made mistakes regardless of the platform. Under distracted conditions (Task D) participants were more likely to make mistakes. The results of the second cycle were largely similar to those of the first, in that users still made errors in similar name and distracted conditions.

Perspectives on errors when using money transfer apps.

When asked about mistakes in similar name instances, P1 said: *"I assumed that Arlene Cooper¹ was associated with potentially the only Arlene...And [also] the way Venmo works is your friends show up first. So I just paid Arlene Cooper"*. Several other participants responded that they believed the recipient at the top of the list was correct and did not notice the presence of multiple people with the same display name. In the second cycle, the inductive analysis showed that all users preferred the new prototypes regardless of whether or not mistakes were made. Moreover, participants responded favorably to the Undo feature and commented on their perception of the color-coded commands-indicating a preference for a red command button to draw more attention to the selected command especially when executing a payment.

While participants indicated that they confirmed their transaction details before completing the transaction, this did not reflect in practice as they still made mistakes on the assigned tasks. They also did not feel that the time limit significantly impacted making mistakes, and most indicated feeling distracted when a call came through while completing the task.

5 Discussion

The results suggest that time constraints alone were unlikely to be a source of errors. However to limit distractions when using money transfer apps we made some design recommendations (Appendix 3) that should be evaluated further in a bigger study. Users should also have an option to briefly mute all notifications in their preference settings. However, since the participants did not use their own smartphones in the experiments, they might have been more distracted than if they were using their own phone. Future studies should also explore this further.

Our improved prototype to mitigate user errors in similar name situations did not significantly draw users' attention, potentially because of the font size and highlight color that we used. We recommend testing this with a bold color given the effect of color on drawing user attention that the participants shared.

¹pseudonym name

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Figure 1: Appendix B: Recruitment Flyer

Applications	Tasks	Expected type of mistake	P1	P2	P3	P4	P5
			Did the participants made mistake?				
Paypal	A1: Non-rushed	Any	No	No	No	No	No
	A2: Non-rushed, same name recipient	Wrong Recipient	Yes	No	No	Yes	Yes
	B1: Rushed	Any	No	No	No	No	No
	B2: Rushed, same name recipient	Wrong Recipient	-	No	No	Yes	Yes
	C1: Manipulated recipient	Wrong Recipient	Yes	No	Yes	Yes	Yes
	C2: Manipulated command	Wrong Command	-	No	Yes	No	No
	D: Manipulated command with distraction	Wrong Command	-	Yes	Yes	No	No
Venmo	A1: Non-rushed	Any	No	No	No	No	No
	A2: Non-rushed, same name recipient	Wrong Recipient	Yes	No	No	Yes	Yes
	B1: Rushed	Any	No	No	No	No	No
	B2: Rushed, same name recipient	Wrong Recipient	-	No	No	Yes	Yes
	C1: Manipulated recipient	Wrong Recipient	-	No	No	Yes	Yes
	C2: Manipulated command	Wrong Command	-	No	Yes	No	No
	D: Manipulated command with distraction	Wrong Command	-	Yes	Yes	Yes	No

Figure 2: Appendix C: Summary of Experiment Tasks and Corresponding Participant Outcomes

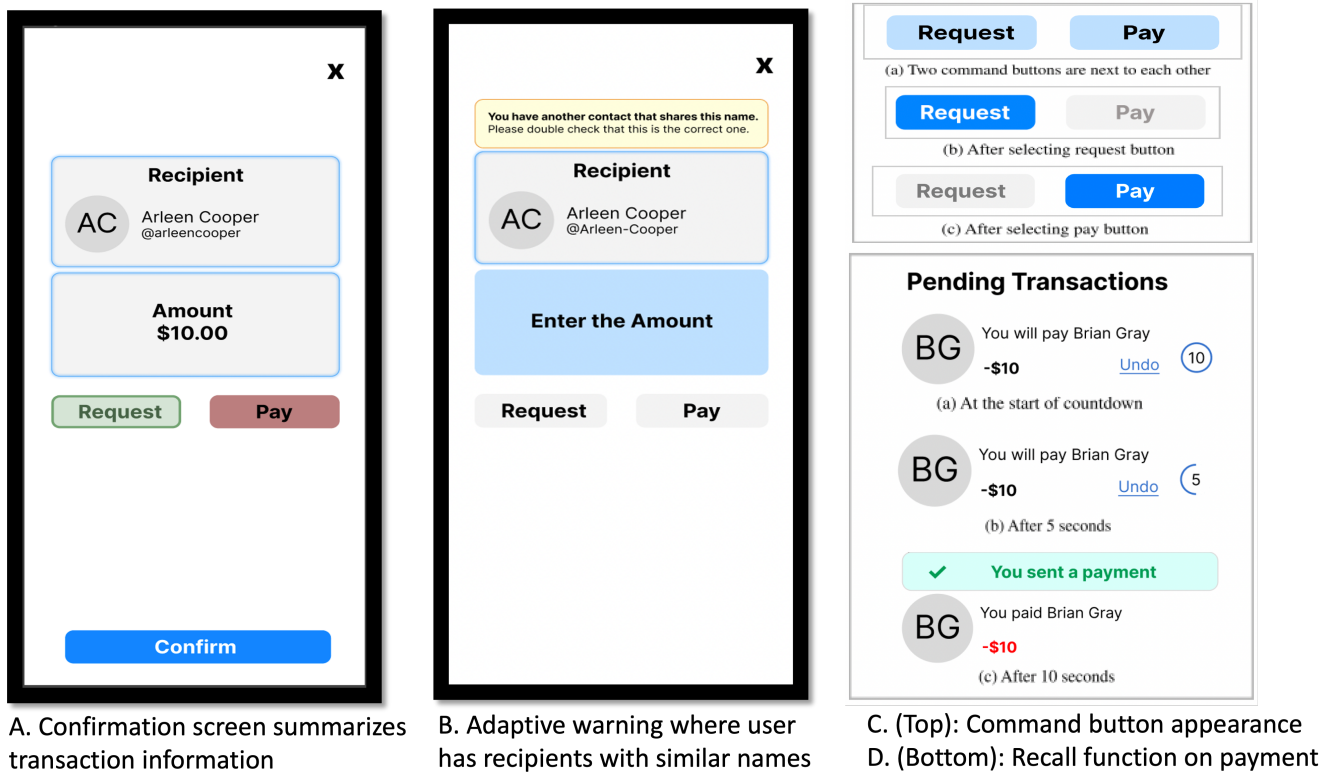


Figure 3: Appendix D: Improved Prototypes