



Pay by cash? Quickly design-inspired studies to gain insights about people financial transactions

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In this work we aim to investigate the way people behave and think about transactions in everyday life. In industrial lab research, it is not always possible to conduct full-scale ethnographic studies to understand people's everyday practices in support of the development of new technologies or to understand the ways in which technology may improve people's life. We apply a less-time consuming design approach to gather preliminary ideas in preparation for more in-depth field studies. We describe four design-inspired studies to gain insights about user thoughts and behaviors while engaged in financial transactions. We also provide important design considerations for developing mobile payment systems using social networks.

1 Introduction

In industrial lab research, it is not always possible to conduct full-scale ethnographic studies to understand people's everyday (often mundane) practices in support of the development of new technologies or to understand the ways in which technology may improve people's life. Projects are tied to strict deadlines and resources, subject to organization changes and the like. Besides, some research subjects and contexts are particularly challenging to investigate in-situ, for example, to examine everyday money transactions mediated by personal devices, without affecting the usage experience. In our research, we want to unpack the nuanced ways in which people behave and think while making financial transactions via electronic devices. We are also interested in using rapid approaches to understand basic human values and insights present in traditional payment services that can be carried over to mobile cash use (Dahlberg, 2011). To this end, we have devised and employed a particular combination of user research methods to quickly gain insights about people without obstructing the overall project development flow. This preliminary user research becomes the basis for future fieldwork. The team is able to reach the field with an overview of user issues and with an awareness of the kinds of information to be gathered to enhance the project. We describe the use of early design-inspired user-studies in support of ethnography-informed system design. In this case study we present several design research methods that were used to quickly discover important user behaviors that are relevant to consider when designing information in a the domain of digital money.

2 Background

Several methods are available for studying mobile cash services: observation studies (Taylor, 2011), interviews (Mallat, 2007) and survey data (Kim, 2010). A set of human centric design practices to unveil finance behavior in the field also can be seen in recent human-computer interaction (HCI) conferences. (Chipchase et al., 2014; Vines et al., 2014; Kayeet al., 2014). Methods such as Games are used as a technique for investigating decision-making in economics

(Sanfey et al., 2003). Other studies explore people's perception of how physical forms of payments (e.g. paper money, card and gift certificates) may affect spending decisions (Raghubir et al., 2008). Updates and finance incentives are activities that result in positive feedback in crowd funding campaigns (Xu et al. 2014).

Our contribution to the Information design field is to describe design-inspired studies to gain insights about user thoughts and behaviors while engaged in financial transactions. We also provide important design considerations for developing mobile payment systems using social networks.

3 Design-inspired user studies

In this paper we investigate the way people behave and think about financial transactions in everyday life. Because of various project constraints, we opted for a less-time consuming design approach to gather preliminary ideas in preparation for more in-depth field studies. We thus devised a design-inspired user-study that is comprised of four main phases and methods in the first quartile of 2014. First, we wanted to understand people's expectations of future finance systems by discussing concept scenarios illustrated by storyboards. Second, we observed social interactions of people making financial transactions in a simulated environment with a board game. Third, we aimed to gain people's personal perspectives on everyday transactions by means of a cultural artifact kit. Fourth, we investigated people's rationale for payment choices in various situations. As a result we collected thirty ideas and suggestions for our project team to consider while designing mobile payment systems. We discuss fifteen of these in this paper because of space constraints.

Concept Scenarios

Our project team started to investigate financial transactions by having a brainstorm session about the experience of having a digital version of a paper money. What would be the advantages to pay by cash? Cash is anonymous, portable, transactions are scalable, untraceable, decentralized, off-line capable and has a wide acceptability in situ. What would be the disadvantages to pay by cash? Cash is unrecoverable, not worldwide acceptable and not always available change. The challenge was to think about digital cash scenarios that incorporated and improved upon the characteristics of paper cash. As a team we envisioned three scenarios of digital cash use and illustrated them by a storyboard (Van den Hende et al, 2007).

Ten potential users were invited to participate in a focus group seven accepted the request. Participants were aged 21-39 years old. Most of them had a background in Engineering. All them had a smartphone and worked in the same multinational company, although in different departments. The research team discussed the participants' video record. Ideas and suggestions were gathered from this pilot study to inspire future payment systems and define what factors to focus on future field studies.

In the focus group session, the facilitator provided some background setting material. The scenarios were then presented one at a time, each followed by discussion.

SETTING: *In the near future we predict that we will not have traditional methods and business models to do financial transactions. Paper cash and credit cards will not exist anymore. We will not have centralized financial institutions as well. Therefore, we prepared illustrations to understand how this future will be.*

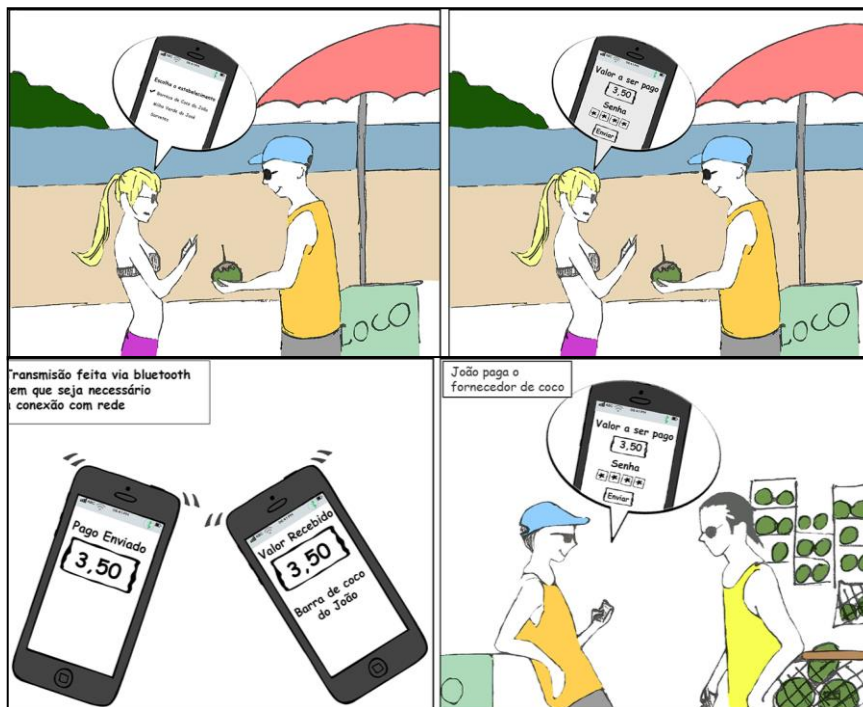
Scenario One: *Ana and her boyfriend are enjoying their holidays in Brazil. Ana goes to the supermarket to buy their take away lunch to the beach. Ana gets her mobile phone to pay the bill. The mobile payment system indicated Ana's friends to authorize the transaction for her.*

Figure 1: Ana goes to the supermarket to buy her take away lunch. Ana gets her mobile phone to pay the bill.



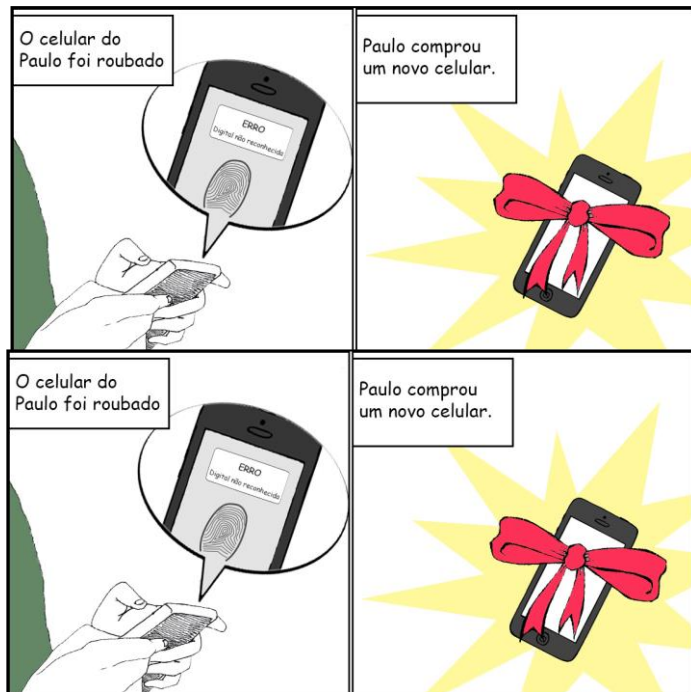
Scenario Two: Ana and her boyfriend are enjoying their holidays in Brazil. Ana is at the beach and wants to buy a coconut water to enjoy with her sandwich. The only problem is that she can't use a network connection. (Figure 2). The researcher addressed contexts with no network connection (How can she pay? What do you think about this idea?).

Figure 2: Ana is at the beach and wants to buy a coconut water to enjoy with her sandwich. The only problem is that she can't use a network connection.



Scenario Three: Paulo, the coconut supplier had his mobile phone stolen. He bought a new one and wants to use his credits to pay for goods, but does not know his credit balance (How does he recover this information?). Remember that we will not have centralized institution to track this information. (Figure 3)

Figure 3: After his phone was stolen, Paulo bought a new one and wants to use his credits to pay for goods. He no idea of his credit balance (How does he recover this information?).



Ideas and suggestions:

1. Payment systems could be integrated with the commercial establishment; Establishments connected in the same network will keep the purchase history and centralize the transactions. Perhaps establishments can have their own validation network.
2. There should be a way to complain about or to recover lost or stolen money. People like centralized finance institutions because they can trust and they have a channel to communicate if something goes wrong.
3. It would be necessary for people-assisted transaction authorization only if the amount is higher than the amount people have in their credit balance.

In the context of mobile payments for exchange digital cash, researches identified three roles in the study: the buyer, the receiver and the authorizer. The last could be a trader network – a social network of establishments for example.

Board Game

In this study, we invited six people to play a board game to encourage interactions using cash mediated by an electronic device. Our main questions were: How do people deal with privacy? How do people negotiate or even lend or borrow money from each other? Do people act similarly in similar situations? What kinds of conversation emerge from the game?

We wanted to simulate social interaction of people that knew each other doing financial transactions. We hypothesize this context is very difficult to observe in real life, as people perform financial activities with close people in private. In order to simulate real transactions in everyday life in a game (Deterding et al., 2011), participants played a new version of The Game of Life

(Estrela toy manufacturer) originally created by Klammer and Bradley. In the game, payments were made by credit cards in a machine, instead of paper money (Figure 4). The game has everyday activities such as paying for college, having kids, or buying house insurance. We asked participants to imagine that the game machine would be a mobile phone, inspired by methods already existent in the HCI field (Iacucci et al, 2000). We also asked participants to verbalize their thoughts while playing the game with their colleagues. In our game we changed some rules: Anyone was a banker, therefore anyone could interact with the machine; every player started with 100 reais; we only used three gift paper cards: salary card, insurance card, pass the debit and share the debt; the player who is richest after 30 minutes is the winner of the game (see Figure 5).

Figure 4. The Super Game of Life by Estrela.



Three researchers observed the players during the game and took notes during the session. The session took about 40 minutes and the participants were subsequently invited to participate in a follow-up study.

The age range of the participants was between 21 to 33 years old. Most of them were students working as interns in a multinational enterprise in Brazil. All of them knew each other for more than 6 months. All of them had experience of playing the old version of the game. Three of the participants have used mobile bank apps to consult their statements, and to complete bank transfers and payments. The other three participants did not use bank apps because they considered them unsafe, or they did not have a credit card or smart phone.

Figure 5. Participants playing the Game.



Ideas and suggestions:

4. People do not feel comfortable to sharing financial information with everybody. Players preferred to top up or empty the card by themselves instead of letting other players do. “I don’t like to give my card for the others” (Participant 3).
5. Other people may be helpful with reminders about financial events. In the game, there were situation that players passed by a space that gave us the right to retrieve salary, win a prize draw or receive a present. Players sometimes alerted others of this.
6. Some financial decisions are personal and do not follow strict rules or norms. For example, game players decided how much money they should give as a present to someone who gets married or had a child.

Devices and apps supporting financial transactions will require some learning. Players were introduced initially to the main functions of the game machine, although it was not enough – “If I receive a payment and withdraw money. Should I do one or two transactions?” (Participant 5,3). ‘How do I cancel a transaction?’(Participant 2). “Wait, I have to see if it went through, Transaction OK. Now yes!”(Participant5).

We noticed even in the small group, diverse behavior profiles. We identified the presence of five distinct behaviors. The keeper - the one, who saved money, collected paper cards and did not use them during the game. The spender – was the adventurous player who did not care about life consequences in the game. The arrogant boaster – who was several times speaking up his balance and his achievements. The low profiler – was acting more, as an observer and people did not trust his actions. The righteous – he was always fighting for the rules to be followed. It would be interesting to investigate and validate those behaviors in real life settings and to explore profile-specific tools for financial applications.

Cultural Artifact kit

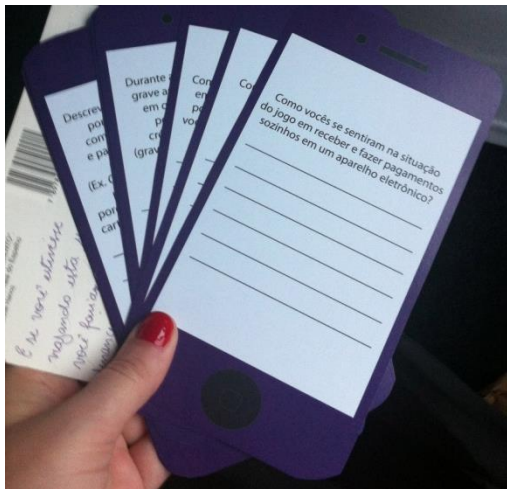
In the follow-on activity, the same participants answered a group of questions about everyday purchases and electronic payments over a period of 12 days. Each participant received a cultural artifact kit, inspired by work with design probes (Wallace et al, 2013), that included a pen, pen drive, post card of a seafront place and questions printed in a paper in the form of a mobile screen (Figure 6). The questions were: 1- Take pictures of everyday situations that you think it would be helpful to use mobile phones for financial transactions; 2-Describe 5 financial transactions you did this week. How did you make payments (e.g., credit card, cash)? Why did you make that choice? 3- Describe positive and negative experiences you had using Internet banking, 24hour-teller, or other finance electronic transactions.4- Post Card with a beach picture– If you were in this beach without network connections, how would you make transactions?

Ideas and suggestions:

8. Mobile payments should be interpreted as in-situ activity. It is a real time activity. It is different than online purchases that users can be in anyplace and anywhere to pay for a good.
9. Inherent capabilities of smart phones (e.g., accelerometers and Bluetooth) – may provide technology base to develop innovative system for offline payments.
10. Paper money was never the first choice of payment. Four in six participants rarely used cash. They carry a small amount of cash in their wallets in case of theft. Using paper money is more difficult for them to control their outgoing.
11. Ways of payments change according to safety, convenience and acceptance. Paper money is used when the establishment does not accept other forms of payment or people

do not trust the place that is receiving the payment. They are afraid of card fraud. Card payments avoid participants to have change availability for paying small amounts.

Figure 6. Cards with questions related to everyday finance experiences.



Value ranking list

The cultural artifact kit activity revealed several priorities and concerns about payment choices. We were still not sure, however, which factors lead people to choose one form of payment over another. We reviewed the results of the activities reported here as well as related literature in the field (Kim et al., 2010). We identified a list of factors and characteristics that might affect adoption of mobile payments: safety; privacy; social network integration; offline use; transfer to anyone you want; passwords/security; installation; Integration with online account; acceptance/adoption; rewards; untraceable; convenience. Six people, who had not participated in the previous studies, provided input as to what they value in their payment experiences.

Participants were aged between 18-30 years old, had familiarity with technology and work in the same company although in different departments. The moderator asked participants to describe the last financial transactions they did during the weekend, the meeting was held in a Monday. And also to rank factors they value when choosing ways of payment by importance order. The moderator asked them to think about the transactions they did recently while doing the ranking. Participants also were requested to describe positive and negative situations with different bank services (mobile apps, cash machines...). (Figure 7).

Figure 7. Form to rank factors participants value when choosing ways of payment by importance order.

Ideas and suggestions:

12. What do people value when choosing ways of payment? (order of importance according to participants) – 1st Safety; 2nd Adoption /Acceptance, 3rd Password/security; 4th Convenience; 5th Privacy.
13. What people are afraid of? Fraud in Internet banking and bank apps. People feel more secure using Internet banking – bank websites than mobile bank apps. “I use the Internet bank but I have never used the mobile. I didn't use because I didn't think it's safe.”(Participant 3).
14. Debit card is more practical than carry coins and bank notes. It is also for them easier to manage bank accounts, as people spend only what they have. “... one day I will have to pay for this because I'm gonna eat the food when I buy and if I pay with my credit card I will pay one month later”. (Participant 4).
15. Credit cards are used to track transactions. Some people preferred this kind of method because they can have a record/historic of spends. “I like to use credit card because I know in the future I can see what I have to pay for and why”. (Participant 2).

In this last value ranking activity, the participants confirmed much of what we learned from the Cultural Artifact kit study.

4 Final Remarks

The pilot studies reported in this work served to identify important factors to explore in future fieldwork. We now have a better understanding of people's expectations of future financial innovations, people's financial values and their use of current payment modes.

In summary, we have gathered ideas and suggestions to be considered for developing future mobile payment systems. We have explored the use of using social networks to support financial events; ways to deal with trust in finance activities; payments choices as a rational to finance management and advantages and drawbacks using electronic finance apps or devices.

Care should be taken applying our results to other contexts without further research. There are various critical factors that affect a people's use and perception of ways of payments, and hence the generalizability of this study. These include culture, educational background, finance situation and experience. Our participants represent a young demographic with familiarity with technology and finance experience with current ways of payment (paper money, cards and online purchases). However, our study included people from only one place. The studies took place in metropolitan areas of Brazil – São Paulo and Campinas. Brazil is a large country with diverse realities.

We plan now to conduct a series of field studies with communities with various demographic characteristics. We will use the findings from the pilot studies and related research (Diniz et al., 2012) to gain more in-depth understanding of such insights while letting developers get their development work started. That is, the team is able to reach the field with a preliminary overview of user issues, with an awareness of the kinds of information to be gathered so as to enhance the project. Moreover, the future fieldwork will explore factors we could not elicit in our preliminary design-inspired studies. For instance, people's dreams and worries related to money, financial routines and financial priorities. We will also validate factors gathered and behavior profiles identified in the pilot studies.

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