Service design tools to explore financial services for poor microbusiness owners

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Abstract

This paper presents a *case* study where a research team applied service design tools through the design process of new financial services for the poor. Service design tools were applied to immerse the research team into the reality of small business owners, which were also microcredit customers, living in poor neighborhoods of Northeast Brazil. Such tools were helpful not only to enforce a user-centered approach for the project but also to understand the stakeholder's expectations and aims. Design activities consisted of contextual interviews with small business owners and research team interaction and ideation, including: fieldwork debriefing with pictures; journey maps; personas; scenarios; service design blueprint; wireframes and mockups. We present lessons learned from the application of this usercentered design process supported by service design tools.

KEYWORDS: service design tools, design process, field research, collaborative teamwork, financial services

Introduction

Financial transactions are fundamentally embedded in a multi-person context and involve the coordinated action of multiple actors. For example, basic payment systems involve a buyer and a seller. The transaction, however, is completed within the context of a financial system that includes organizations (e.g., banks, governments) and the coordination of a rich network of other groups (e.g., competitors, suppliers, transportation providers).

Understanding awareness of this larger context is required for project teams involved to design new service innovations that are expected to be readily adopted and provide benefits to the greater financial ecosystems. The first step into this journey, from a Design Research perspective is to explore the context by understanding final users. Insights gathered from contextual interviews and observation studies are the initial resource for the project time to innovate in this area. A series of team workshops were used to make the discoveries available these are valuable to further understand the common force and boundaries of service innovation.

Inviting Small Business Owners (SBO's) to a new setting to be interviewed might influence the way they are going to answer some of the contextual questions, this would avoid the research team to do their observations. In their natural environment, fieldwork participants can show and exemplify what they tell us in their establishments. Additionally, bringing the whole research team to do fieldwork might be uncomfortable for the participant. In those situations, design researchers bring field evidence to project teams in a form of: audio files, pictures, field notes, and drawings - to illustrate and give a sense of reality into project discussions. Integrate design research findings and immerse project teams (developers and project managers) into the project context is a valuable design skill. (Edvardsson, 2000; Hawkins, 2015). For this reason, several design activities are valuable to explore findings and assist the team in the first stages of the project. Sarmento & Patricio (2014) presented the results of a study that consisted of three iterative service design cycles that enabled "customer experience" awareness for the development team. Their goal was to comprehend customer experience factors from qualitative studies to optimize service offers. In our study, we also follow a Design Research methodology and illustrate our experience applying service design tools to synchronize project team and design new financial applications for small business owners.

The aim of the fieldwork, the initial resource for this project, was to have a better understanding of formal microcredit services. On the other hand, informal microcredit practices identified in the fieldwork were a richer resource for the project team to have new ideas for future financial services and applications.

This paper reports the design process of a financial app created to support informal credit practices of Small business owners (SBO) identified during the fieldwork. It shows the value of design tools to understand user context by data collected in the field. We aim to address those research questions:

- Which service design tools should be used to transfer knowledge acquired in the field to project team members?
- Which service design tools should be used to apply transferred knowledge from fieldwork activities to create new financial services and applications?

The contribution of this paper is twofold: it first describes design tools to promote common ground understanding of what was learned in the field, and secondly shows how the team moved forward using design tools to create a new financial application for small business owners.

Context: Microcredit Services based on Solidarity Groups

In order to better understand the credit practices of the SBO, we interviewed participants in a microfinance program with a bank in the northeast of Brazil. Solidary groups are groups based on shared moral obligations as well as shared interests. (Tsai, 2007). Yumus Muhammad introduced this concept to microfinance in the 70's with the Grameen Bank in Bangladesh "Group membership not only create support and protection but also smooth out the erratic behavior patterns of individual members, making each borrower more reliable in the process. Subtle and at times not-so-subtle peer pressure keeps each group member in line with the broader objectives of the credit program. Because the group approves the loan request of each member, the group assumes moral responsibility for the loan. If any member of the group gets into trouble, the group usually comes forward to help."(Muhammad, 1999). Microfinance institutions use solidary groups as a base to provide alternative loan security allowing people with few or no assets to have access to micro credit and raise themselves out of poverty (Yang, 2013).

In our research context, the first step to become a member of a solidarity group is to be accepted by a SBO's group, and then be evaluated by a bank agent. The groups are small from 3 to 10 members and they should know each other. Family members are accepted if they are not involved in the same business or living in the same house. The group is selfregulating and collectively responsible for the loan, i.e., every member is a guarantor for the rest of the group and the group coordinator is responsible for collecting the payment of all individual loans. The loans are granted individually based on a separate credit analysis (per client) and the amount may vary according to the client's capacity to repay. The repayment term is fixed for the entire group. They renew the loan with the group and the bank, every 4-6 months. In our study, merchants have renewed the loan more than three times. One in particular, did 48 renews since she started the program. There are two ways to become a member of a solidary group: by bank agent invitation or by a request form from a friend or acquaintance. A requirement for a current member to invite a new member is based on the morality standards observed in everyday life. Groups have a leader, called a coordinator, who receives the credit instalments and pays into the bank. In our study, six in twelve participants were coordinators of groups. Only one person, the group coordinator, makes the payment. If someone does not have their instalment payment that month, the other members have to pay it for him/her. Group coordinators have a status in the group, and also in the society. People see them as trustful people. The group members choose coordinators. They keep the group together and have a more frequent communication with the bank agent. They are the ones who motivate others to pay. There is some variability in the amount of social interaction among the solidarity group members. Usually, members only meet at the loan renewal meetings. On the other hand, some members live nearby and sometimes meet informally. In other groups they have a more friendly relationship and a sense of responsibility for each other.

Design process

In this project, design process was supported by fieldwork findings that generated insights into new financial technologies for small business owners. A set of design tools was chosen to conduct project discussions, into the first stages of Design Research. Design Research - also referred to as the design experiments approach - was developed as a way to carry out formative research to test and refine designs based on theoretical principles derived from prior research. In general design research, authors agree that the design research process consists of three main stages: Preliminary Research, Prototyping phase and Assessment phase (Plomp, 2007). Reeves (2006) and Nieveen (2006) add one more stage: reflection and documentation. In this study, we concentrated our efforts into Preliminary research and Prototyping. In the Preliminary research phase, the main design activities were fieldwork and co-worker workshops. The aim of this stage was to promote the teams common understanding of what two researchers learned in the fieldwork activities. In the Prototyping

phase, as a team, we envisioned scenarios and storyboards to create the first mock-ups and interface design screens for a financial app. In this second phase, insights and new ideas about services and applications based on the preliminary research stage were becoming tangible through the use of service design tools.

The project team was composed of people from diverse backgrounds: Design Research Visual Design, Computer Science, Social Computing, Project management and Humancomputer Interaction. Five of these project team members are researchers in an Innovation lab in Brazil and one is an intern that participated in the process. The purpose of this sixmember team was to look for innovations within the microfinance landscape. The design activities were lead by the researcher with a background in Design Research, which is also the first author of this paper.

Preliminary research

In September 2014, two researchers spent a week semi-immersed in the everyday life of microcredit customers and bank agents from the northeast of Brazil. The main purpose of the field study was to understand microfinance practices from the eyes of their participants and look for new ideas and strategies for innovate in financial services. We conducted 20 semi-structured interviews and work observations in two cities. The first city was Fortaleza, a capital city and an urban environment. The second was Icapuí city, located in the semi-arid region on the Northeast seafront. Contextual interviews were undertaken with 12 small business owners (entrepreneurs) and 8 bank agents from a Microfinance Institution (MFI). Participants were recruited by the MFI. Overall, data collected comprised of 25 hours of recorded audio files, 315 pictures and field notes.

The researchers asked the SBOs, about their financial activity (e.g., what were their low and high expenses, how did they track expenses and generally how did they manage cash flow); financial instruments (what tools did they use to track income and expenses, how did they monitor, bank accounts, and what kinds of technology was used); financial planning (how did they think about the financial future and priorities); savings; payment methods (e.g., credit and debit cards, cash, bank check). Those categories were inspired by previous research (Vines et al., 2012; Kaye et al., 2014; Chipchase et al., 2014). We decided to add two more categories: microfinance experience and financial logistics. The first was to elicit details about the process of obtaining credit from the MFI and the role of solidarity groups, which was a primary focus in this study. The second was added to understand how the money flows between the MFI and small business owners.

Bank agents' questions were structured to understand their work practice (the specific MFI goals and approach, work tasks and activities, technology use); financial education (instructions and advice given to clients); communication tools (information system usage and mobile phone usage); loan management (cashflow maintenance); new client prospecting, and logistical details of the microcredit activities.

Data transformation was applied in order to count the frequency of categories that emerged in the data. (Creswell, 2009). A set of 52 categories was created to organize the data collected. These categories were used to drive the interpretation and findings presented bellow. NVivo software was used to analyze the qualitative data - transcriptions of audio files and important notes taken during the fieldwork. The overall findings, mainly from the field notes were the main resource to share knowledge acquired with the project team back home in the first weeks.

All the small business owners (SBOs) were members of a credit solidarity group. Most of them were living in marginalized neighborhoods in the Northeast lacking basic sanitation. The average value of their loan was R\$ 4.000, 00 (about US\$ 1,000.00). They own a variety of businesses, including small grocery stores, restaurants, and clothing stores. A majority of the SBOs were female (9 of 12) and the average age was 45. Family education was one of their main priorities; all the SBOs who had children had their children at school. Some of the SBOs had two jobs, their business and a formal job to support the family. The participants in our study had mobile phones and some of them computers. Surprisingly, most of them have Internet connection on their mobile phones and computers, even though some of them lack of basic sanitation in their houses. Only three participants did not use Internet services.

Generally bank agents were well educated, younger and highly motivated. Five of eight were currently enrolled in university programs. All of the agents we interviewed have been working with the MFI for more than 2 years. The bank agent was the primary bank contact within the community. They provide financial education and advice, answer questions, and look for new microfinance members. Each agent is responsible for one or two geographic areas and works with about 1.000 SBOs. The agents are aware of most of the businesses in their area and have a good relationship with the microfinance members. The coordinator of each group is the main communication channel with bank agents. Bank agents contact their customers by phone, visit them when necessary and participate of microcredit renew meetings. As they work with customers from the same neighborhood it is easier to keep a good relationship with bank customers, since they are frequently visiting customers that are neighbors. This relationship is based on power, respect and integrity. Bank agents build a trusting relationship with their clients. The community is the main source of information for the bank agents to recruit new customers and knowing if current customers are using the credit for growing their business.

The following four sessions describe service design tools to promote team common ground understanding of the field. For each tool, a description of the process, advantages and drawbacks of applying the tool, and information extracted from fieldwork resources that contributed to the project are highlighted.

Unpacking field study with pictures

With such rich resources collected from field research, and several hours ahead to analyze all the data collected, we decided initially to apply design tools to share our findings with the project team. The debriefing started with a 2 hours meeting showing pictures of the field. Field researchers (a design–researcher and a computer scientist) highlighted their experience by chosen pictures taken from the field. Stories were told giving life to the places shown on the pictures (Figure 1)

Teammates asked questions about loan workflow and the role of the bank agent in the process. The process of transferring information to the team in this phase was not a linear process; questions were made related to any phase of the field research, consequently some team members get a little confused resulting in extra time for explanations. Therefore, a more linear explanation was needed for overall understanding. On the other hand, time anxiety was decreased, since they did not have to wait until the data analysis was ready.



Figure 1 Field pictures shown to team members that did not have the opportunity to go to the field. From left to right, in the first line some pictures of SBOs in their establishments are shown, i.e. car wash, snack bar, mini-market and restaurant. The second line gives a variety of contexts and landscapes we visited, i.e. grocery story was across the trash dump, semi-arid area, beach area and a rural area. The third line highlights interviews moments, i.e. SBO's house interior, interviews with bank agent, SBO's paper payment tracking and participant signing the consent form.

Journey map

A journey map helps teams identify the touch points where users interact with a service (Stickdorn &Schneider, 2011). Our Journey map information was extracted from recorded audio files from the user research. In this stage the data was already analyzed and more insights could be given to the team. In a workshop, the project team observed the illustrated Journey map and some pictures of SBO's on the wall. Every person received a set of colored post-its to use during the session. Project members looked for opportunities to innovate the microcredit service (green post-its), points for further research (yellow post-its), and identified drawbacks in the service process (pink post-its). We found 15 service innovation opportunities. The team considered the drawback issues a starting point for generating new ideas based on social practices of SBO's and bank agents. (Figure2).





Figure 2 Journey map workshop

The weakness of this design activity was the restriction of considering only SBO's point of view and not the whole ecosystem of the microcredit loan practice. For this reason, the next two steps consisted of creating a Service blueprint and a Stakeholder map. Fieldwork source materials informed the first activity. The second one was created in a collaborative process.

Service Blueprint

A service blueprint was necessary to illustrate the in depth microcredit service, considering the user journeys, the touch points and the backstage processes (Polaine et al., 2013). The invisible line (the backstage process) in the service blueprint helped the team to see hidden meanings and behaviors that will not be visible, only looking at formal documentation (MFI website and brochures). The service blueprint served as a base for us to think how the opportunities raised in the last activity (journey map workshop) could fit in the microcredit ecosystem.



Figure 3 Service Blueprint for Microfinance service studied

In this phase, the team identified SBO's need to deal with everyday obstacles that prevent them to grow their business faster. Discussing each phase in the service blueprint we identified the role of the bank agent as essential in the loan process. In order to scale up the loan process the option of replacing the bank agents would not be a clever solution, since the community trusts in them and see them frequently when they are operating in the area. The team started the discussion of informal practices using the steps of the Service Blueprint.

It is clear the microcredit loan helped SBO to grow, although some social practices affect their business growth everyday. Attention was given to informal social practices identified during the fieldwork – Buy and Sell categories illustrated in the Service Blueprint (see Figure 3). For many small business owners, there is an important subgroup of customers who buy products using informal credit from the merchant through a Brazilian form of lending called "Fiado."

Fiado is a credit practice that merchants sell products to a customer based on trust that the customer will repay the loan in the future. The date for repayment of the loan is variable and informal e.g. "Next week, "Next month"; "I will pay it later". Sometimes, SBO's do not have money back in change in those cases the SBO's is the one in debt with their customers. SBO's track loan payments and money back in notebooks, and many times were not easy to find the purchased product, date, value and the name of the customer. This social innovation way of doing informal banking transactions (lending and borrowing) is based on social trust and friendship inspiring us to design a new service design for SBO's.

We decided, as a team to work on a financial tool that would benefit the SBO's to manage their business better and also help the stakeholders. The following activity was to make a stakeholder map to identify stakeholder's expectations of a new financial app.

Final users and stakeholders

While visiting the field, design researchers had informal interviews with MFI microcredit directors and microcredit office employees in the Microfinance Institution. A stakeholder map was created with the project team members to register *official* information collected and share it to project team. This activity helped to refine project aims and identify stakeholder's expectations. We consider as stakeholders: SBOs, solidary group coordinators, merchant customers, suppliers, MFI, government, social institutions and Industrial lab researchers. (Figure 4).



Figure 4 Stakeholder map (partially illustrated)

We concentrated our efforts into SBOs, social institution managers and social data researchers for the service innovation embodied in the future financial application. For instance, a small business owner could use a financial app to help them to manage their business more efficiently; a social media analyst could model relationship graphs from data gathered from a financial app to have community healthy metrics.

We illustrate here, the approach taken to assist SBO's to manage their business. In order to make those aims tangible, we create personas (Pruitt& Grudin, 2003; Cooper, 1999) to help in the design process. Maria Socorro Sobral, our persona, was inspired by the fieldwork findings and market/MFI reports. (Figure 5). Presenting personas was fundamental in

helping the team to know more details about our public (SBO's), since *Mario do Socorro* carries real life characteristics and situations that happened or were heard in the fieldwork. This phase implicated directly on the prototype design.

Maria is a SBO proud of her business, her honesty and her social status in her community. In the graphic interface design this "proudness" should be highlighted. Project team also had a better vision of how SBO's use fiado. Maria only does Fiado for people she knows usually, although she would rather her customers pay by cash. The project team reflected on ways Maria could benefit from Fiado and future cash flow.

Maria Socorro Sobral, Grocery owner

"I always prefer to buy produc but I use the credit card when time".	Role: Business owner for 5 years Lives in <u>Lopul</u> 42 years old Husband is a Taxi driver 2 kids: <u>Elics</u> 6 years old e Carlos 9 years old Solidary group member for 3 years Solidary group member for 3 years Solidary group comment Solidary droup comment Solidary droup comment Solidary group member for 3 years Solidary group comment Solidary grou	Motivations: Grow her business Please her clients Manage her personal and business finance Manage inventory by season Save money Frustrations: Once I accepted fiado from Marcílio and he didn't pay me back, even after he got a job. I hope he never needs me again. Tasks: Know her outstanding balance Take notes of name, date of expense and value when selling fiado. Not always she has change, so she takes notes of the amount
"Our name is the most precious thing we have, that's why my priority is paying what I own".		she owns. Call clients
Skills: • Basic Functional Illiterate • Knows basic maths • Makes cakes	Favorite Activities: • Go to the Protestant church • Travel to buy products in Mossorô • Host solidary group meetings in her home	Dream: • Home improvements • Buy a motorbike to deliver her cakes Technology: • What's up

Figure 5 Our SBO's persona

Prototyping phase

With a common ground understanding of what the team learned during the Preliminary research, the team turned the fieldwork findings and design insights into artifacts, materializing and making the information collected tangible. Three design activities were undertaken in this stage.

Future scenario

In order to design the navigation flow of the financial app, the team collaboratively created a future scenario of how SBO's would use this app. We started defining SBO's expectations to use the app and the outcome after using the app for the first time (Carroll, 2000; Llitjós 2013). We also identified during the workshop doubts (pink post-its) in the future scenarios and the backend technical issues (green post-its) that were crucial to make the app works. A step-by-step line representing the user flow was discussed and registered with post-its.

The advantage of this activity was the team integration. Designers, managers, social and computer scientists were all in the same room defining details for the first cycle of the financial app. The Scenario definition was to be able to help developers to start their work in

parallel, to design and project manager activities. The disadvantage was that one cycle of this activity does not cover the overall motivation of future users (manage their business better) and neither outcome (grow their business) of future users, so that more cycles were needed. The challenge for the design researcher was not to let the team go deep into technical discussions in this phase. The focus should be on the end-user and future steps he/she has to do to achieve his/her goal.

Illustrated interface wireframes

The next activity was a one-hour workshop. Team members received 6 post-its and were asked to draw the previous scenario screens on 6 post-its (Llitjós, 2013). In participant's words: "So, this is when the magic happens". Since we materialized the fieldwork findings into system features it made clearer the interface design process for the team. For example, at this point the team knew how social practices worked based on community trust; how SBO's took notes of their customer's purchases and which type of payments they were willing to receive. This kind of information was crucial to organize elements into system screens. After project members draw their screens, they presented it to the whole team. Subsequently, the team discussed what were the best screen elements and navigation flow.

Some team members did not feel comfortable sketching, in these situations, it was important to insure that the objective of the exercise was not visual perfection. It was a collaborative wireframe decision. Designers wrote some explanations of the proposed options in order to remember team decisions and to aid design in future user graphic interfaces.



Figure 6 Illustrated Interface wireframes

Service mock-ups

The illustrated wireframes were very useful for designers not only met users expectation but also team expectations. Our observations of the prevalence of informal lending among the SBOs have encouraged us to envision the possibility of new financial management tools for small businesses. As we mentioned before, SBO's usually do not see Fiado as a positive practice; they would prefer to receive the money on the same day rather than an uncertain day of payment. Therefore, our challenge was to design an app that might help SBO's to understand Fiado in a positive way. They did not realize Fiado is a kind of credit that they can take advantage of to use as future cash flow. Additionally, SBO's know their clients better than banks, and this source of information can be valuable to the bank for evaluating new customers when some of their clients or themselves might ask for a loan.

We designed a new app that may help business owners to manage, plan and predict their financial life. Additionally this app might facilitate their access to small loans. In the first screen (Figure 7a), users are able to see the last customers transactions in their establishment and their status. Customers in blue are in the Fiado status, customers in orange the storeowner has to give change back, customers in green paid for their last purchase. As we expect SBO's value their Fiado loans, we decided not to use red as a colour to show Fiado status, because this colour normally is associated with debt in financial applications.

In the second screen (Figure 7b), the system shows all the last payments and predicts future payments in a calendar view. The system will learn the fuzzy dates of payment from customers and will be able to predict future transactions. The third picture (Figure 7c) shows SBO looking at the best Fiado customers and the value she will receive from them. Storeowners can ask for small loans in the app and have the Fiado as a collateral. The SBO can pay the bank back when she receives the payment from their Fiado customers.



Figure 7(a, b, c) Prototype design

Clearly, additional design work is required and validation of these ideas with Brazilian small business owners is necessary. We will continue with additional exploration of the important work practices and then complete the design and implementation of a new ICT artifact based on the design examples presented above. Finally, we plan to make the app available for field-testing with SBOs in Brazil.

Discussion

We applied eight different design tools to promote team common ground understanding and create a new design app. In the Preliminary stage, The first design activity – Unpacking field studies with pictures is one of our contributions for design researchers, this helped to deal with anxiety shared amongst project colleagues and to discuss situations experienced in the

field. The journey map and blueprint activities were complementary and a rich source for understanding the interactions of players in this context. The stakeholder map and personas helped to prepare the team to envision a new user-centered app considering all the context players. In the prototype phase, a collaborative activity made tangible ideas emerge from previous activities and helped designers to choose visual elements in a more efficient manner.

We believe those methods transferred enough knowledge to the team and helped us to design a new app that is being reviewed with customers and in public forums and conferences (Candello et al., 2015).

Final Remarks

Our design process might help project teams when they are in similar projects and situations. It is very important for designer researchers to improve their ability to share what they learn with potential users and stakeholders of the team. Moreover, project teams should be open to participate of those activities. Collaboration (Hawkins, 2015) and support of project managers is essential for the success of any design process. We hope this design process may inspire other teams to work together and share with designers our project experience.

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