Dabbawala: Service and Mobile Application Design

DRS Report

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Industrial Design Centre,
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2015

Approval

The project titled "Dabbawala- Service and mobile application design" under DRS (Design Research Seminar) by Abhishek Chakraborty [136330004] and Hargude Akshay Narayan [136130007] is approved for the partial fulfillment of the requirement for the degree of Master of Design in Industrial Design.

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Abstract

The dabbawalas (tiffin carriers) of Mumbai are a unique community of around five thousand people who efficiently serve up to 2 lac (0.2 million) customers every day. They have been delivering daily lunches from homes to offices for over a century and any kind of error in their delivery process is almost negligible. They have maintained their heritage working process since the inception of the service and therefore any kind of technology has not been incorporated in their work. They are currently facing numerous business sustainability challenges such as reaching out to new customers and also in maintaining their existing customer base. In 8-10 years, the number of customers a dabbawala serves a day has reduced from 50 to around 20 now. Through our research we have understood that they will lose their current customer base soon as similar food delivery businesses with faster and better services are emerging. To empower them we introduce *Dabbawala* — a mobile application that enables partnership between dabbawalas and food services around the city and directly connects them to their combined customer base. This application enables the customers to order lunch from anywhere in the city. Customer registrations and any kind of money transactions are all handled through the application. The application is also used within the Dabbawala community to manage teams and responsibilities.

Figure 1. A *dabbawala* of Mumbai with his bicycle.

Figure 2. Alpha-numeric code on top of a lunch box.

Figure 3. Brand identity and icon of *Dabbawala* app.

Author Keywords

Low Literacy; Interaction Design; Mobile Application; Service Design; Technology Adoption; Dabbawala

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Introduction

The closest meaning of a dabbawala (fig. 1) in English would be 'lunch box delivery man'. His job is to deliver freshly prepared food from home in lunch boxes to office workers by noon and return the empty boxes to the customer's residence by afternoon.

They mainly speak Marathi and Hindi. Technology has not yet been adopted in their business thus features such as customer database, online booking etc. are not available. Their access to new customers is primarily through word of mouth. The working system of the dabbawalas is highly efficient and it hasn't seen any major change in the past 125 years. Their supply chain is made up of a series of collection zones, sorting points, and delivery zones, supported only by their own coding system (fig. 2). The delivery addresses are written on top of the dabbas (lunch boxes) in codes. They however face the risk of business sustainability in the near future as other businesses are coming along with similar and better services.

Their employee strength is almost stagnant as they are not able to get new customers [2, 10]. MNC companies are offering variety of tastes and choices to their employees in their office canteens [1]. Many bachelors don't have home cooked food so they rely mostly on kitchens and fast food [2]. Through research we have found that many who are new to Mumbai aren't even aware of the Dabbawala service.

However, since they do not have any data on the number of total dabbawalas, or any data on the number of total customers, most of them are not aware of the imminent threat to their service. There is no overall analytics on the revenue and profit so they don't have any scope of knowing whether their business is growing or declining. The job of the leader is to take care of the welfare of the dabbawalas; their compensation is solely depended upon the number of customers each dabbawala serves. Through contextual enquiry we have found that apart from the council members most of them are not aware of the inevitable threat to their future. Our challenge was to solve the problems of the dabbawalas without disturbing their heritage tradition.

Our design process included contextual inquiry, brand identity design (fig. 3), HCI user modelling, scenario creation, storyboarding, prototyping, and doing a pilot run.

Preliminary Research

They are affiliated to Nutan Mumbai Tiffin Box Suppliers Charity Trust (NMTBSCT) [7]. They mainly come from farming families and all of them belong to Maratha caste. The organizational structure of the dabbawala community is as follow:
1. The Governing Council, its President, Secretary.
2. Mukadams (team leaders or supervisors).
3. Dabbawalas.

Their working procedure is one of the most efficient and a lot of studies and seminar are regularly conducted to
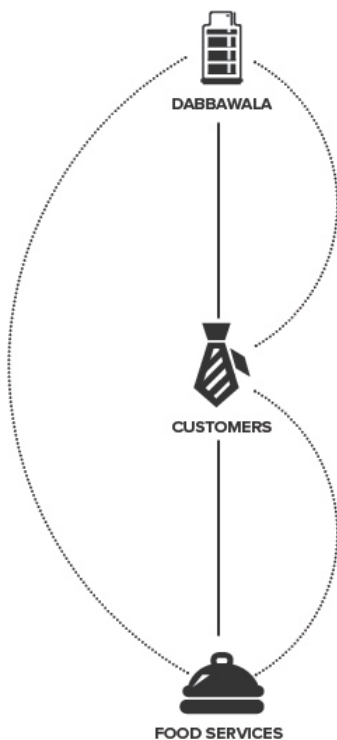
Figure 4. Conceptual model of the new system works

learn from them [11]. They have even garnered interests from names like Prince Charles and Richard Branson.

Contextual Enquiry

We interviewed 27 dabbawalas in total. Although they are fluent in Hindi, conversing in Marathi gives an edge to endear quickly as it is their mother tongue. They are very humble but since they have a tight schedule we followed them in local trains and conversed with them while they were working.

A set of prepared questions were asked. Some of them are mentioned below:

1. How much do they usually earn? Is it enough to run the family? What do their family members do?

2. What do they usually do in their free time? How well do customers treat them? some interesting stories that they would like to share.

3. How satisfied they are with their work? If times have changed in the last few years? Have they changed for the better or worse?

Applying the master-apprentice model we understood their working procedure, and generated design ideas from the insights. The findings from the affinity mappings that influenced the design of our solution included:

1. Youngest members are of ages 18–20 while oldest members are as old as 75 years.

2. Mobile phone is used for team planning, logistics etc. Few of the young members use smartphones as well.

3. The dabbawalas are arranged in groups within their dabba (lunch box) pickup area with team leaders assigned to them. The members of one group vary from 3–5 to 55–60 members depending on the number of customers in their pickup area.

4. Income is based on the number of dabbas distributed. It is equally distributed among the members of a group. They don't have much need and are happy with what they get. All of them are shareholders and there is no visible hierarchy in pay.

5. The wives of most of the dabbawalas do odd jobs like cooking or washing clothes in in other peoples home to run the family.

6. There are always spare dabbawalas in the journey whose job is to take care of emergency situations like misplacement of a lunch box or any accident. This team is changed every two months.

Apart from the dabbawalas, we also interviewed 22 daily commuters. Fifteen of them avail the dabbawala service. The insights generated indicated that those who avail their service are satisfied with it. Those who do not avail are either not aware of the service or do not know how to avail it. . Any kind of online signup or booking is not available therefore most of them do not know how to reach them. They rely on food from their office canteens or from local fast-food eateries (dhabas). They know that local eateries are not very hygienic but they don't have any other options. The quality of food in lunch homes or food kitchens is
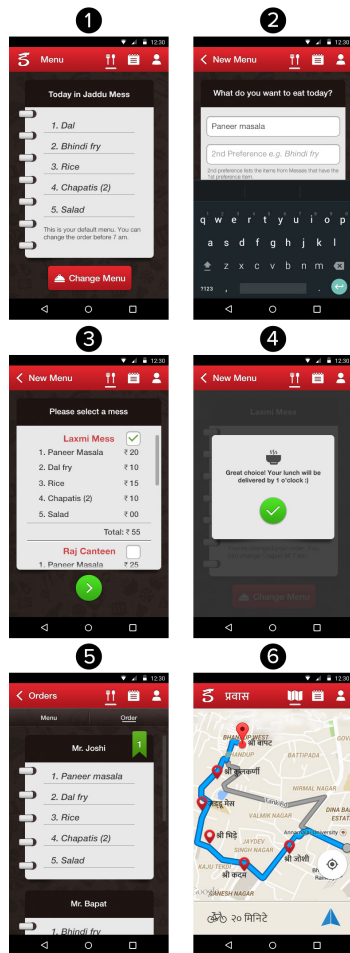
Figure 6. . Application screen flow for changing order: (1-4) Customer places a new order. (5) Canteen gets notified. (6) Dabbawala gets an updated route map.

comparatively better, but either there is none in the office vicinity or they don't have delivery services.

Affinity Maps

We used affinity diagramming to synthesize the findings into specific insights. This helped us identify the following areas of design intervention: branding, attracting new customers, ways of providing more options to the current customer base, better communication among dabbawalas and customers, keeping track of expenses. We felt the need to introduce technology in their business to overcome their current needs. Some of the young dabbawalas already use smartphones and hence we decided to use it as a medium to address their problems. But since most of them have a strong aversion towards any kind of technology [10], technology adoption became a challenging task.

Technology Adoption

Introducing new technology does not bring development by itself, but merely enables it. Further, technology needs to be adopted and sustained by their users before it can enable development [4]. There are people of all ages among the dabbawalas. The solution has to be widely adopted by the dabbawala community for it to sustain [5]. The technology also has to be reliable and accurate and it should impact the dabbawala as an individual along with the whole community for it to be accepted and adopted [3, 5].

Technologies especially the ones that are termed as Information and Communication Technologies (ICTs) have traditionally been used for automation, and specifically office automation. Subsequently, ICTs started being used in non-work environments, including

homes, public places and for leisure, education, and socialisation, though their reach was still limited to urban, office-going, western or westernised, educated, and globalised users. They are the traditional users of ICTs.

The prime factors contributing to the human disadvantage are poverty, illiteracy, social inequity, poor healthcare and environmental degradation [12] - issues that ICTs have not dealt with traditionally. Only within the last decade have ICTs reached beyond the traditional users and have shown a promise to enable human development at large by reaching new users, who may have less education (not reached college), who may be poor (for example, marginal farmers, very small business owners, village artisans catering to local markets), who are often located away from commercial and political centres, and are culturally different not only from the traditional (that is, urban and educated) users but from each other as well [8]. They are the emergent users of ICTs.

Experience, education and age are important variables to consider for the emergent adopters. Additional variables such as prevalence of technology around them could also play a role in technology adoption. Further, culturally, the new users are very different from the traditional users and this may affect their attitudes and motivations.

We decided to target the young dabbawalas who are used to smartphones. They may act as early adopters and slowly make way for the laggards [9].
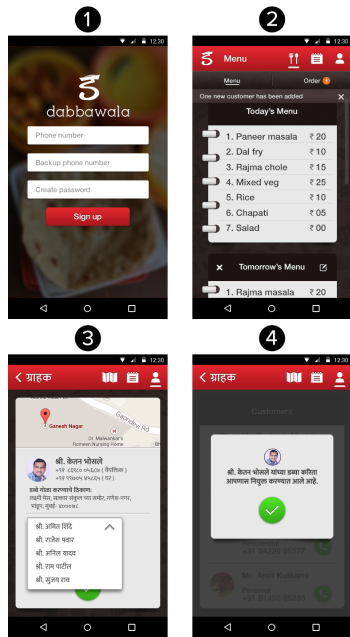
Figure 7. Application screen flow for sign up of new customer:

1. A new customer signs up.
2. The canteen of his choice gets notification.
3. Leader assigns a dabbawala to him.
4. The assigned dabbawala gets notified.

Design Focus

Based on our research findings, we brainstormed active ways for them to attract new customers. The dabbawalas already have a lot of respect among the Mumbaikars (the local people of Mumbai) because of their heritage work culture. We realized that we need to introduce technology but we should take care not to hamper their existing work process. We did stakeholder analysis [13] and mapped customer journeys to help guide our service design process. We chose a mobile application to support it because the smartphone has become an omnipresent part of everyday life and could easily be incorporated into the daily habits of users.

Using a series of time boxed brainstorming sessions with subsequent dot voting we were able to continuously broaden and then narrow down our concept scope.

Related Products

Restaurant discovery services like zomato.com and food delivery services like foodpanda.in are more focussed upon restaurants and eating places which people avail for recreational purposes and usually not on a daily basis. They are helpful for finding new places only; the rest is left to the customers. Other online services for searching eating places like foodpanda.in don't take care of end to end service. Their main job is to take order on behalf of the customer for a particular eatery and be done with it. In this process, the restaurants or eateries that don't have delivery facilities are left out.

Design Solution

SERVICE DESIGN

In order to serve more customers and make the dabbawalas' service available to as many people as possible we have designed a system where the dabbawalas will partner with the food services and central kitchens around Mumbai so that they can jointly serve their customers (fig.4). This will give them access to the huge customer base of each other and both of them will be able to attract new customers.

Through this we also want to give more flexibility to the customers, especially the bachelor employees. Customers currently don't have the option to choose different places to order lunch from every day. Not all office canteens provide good food. With the new service they'll have options to change the eating place or choose new items from the menu every day.

All food services will have spare lunchboxes which can be used to deliver lunch to the customers who have changed orders. It would save time for the dabbawalas who would otherwise have to collect the empty lunchbox from their homes or regular food services.
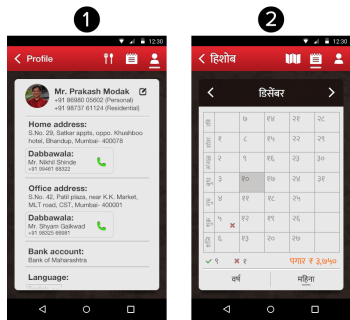
Figure 8. Application features
1. Customer profile
2. Dabbawalas' account
screen

Figure 9. Storyboard
illustrating the main usage
scenario.

THE DABBAWALA SMARTPHONE APPLICATION

Figure 5. Spalsh screen of dabbawala mobile application

Dabbawala — the localized smartphone application will act as the primary interface for customers, food services and dabbawalas. The food services can update their daily menus through it or choose to have a default menu every day. The customers will have options to change their eating place or menu every day right through it. The food services' order list gets updated automatically so that they can pack extra lunch boxes. The app also provides the delivery address code for them to write on the lid of the lunch boxes. The dabbawalas will get notified about the change. The integrated google map shows them the modified route plan so that they can plan their journey accordingly (fig. 6).

New customer will be able to sign up through the application itself. After he provides his pickup and delivery address, the food service of his choice and dabbawalas' leader in that area gets notified. The leader can then assign a dabbawala from his team (fig. 7).

Apart from these, the application will also maintain food services, the dabbawalas' and the customers' profile and will enable contacting any designated person right from its interface (fig. 8).

There will be no cash involved in the transactions and everything will be handled through online banking. History of orders will be maintained and the previous orders for both the food services and customers will be available whenever needed.

Evaluation
Our design process included scenario sketches (fig. 9), low-fidelity and high-fidelity prototypes. We identified the stakeholders as novice and advanced-beginners based on their smartphone experience [6]. We discussed the interactive flow and functional design based on the wireframe and did heuristic evaluation based on Nielsen's 10 heuristics.

We conducted mock tests of the new service which included customers, food services and dabbawalas go through our set of three scenarios and conducted our first round of evaluation. These scenarios reflected problematic experiences that were often faced by the dabbawalas according to our research, such as if a new customer signs up for the service, or if a customer chooses not to order lunch etc. They were paired with an interaction sketch that preliminarily demonstrated

how the application would intervene. All the stakeholders appreciated the new service.

We invited dabbawalas who know how to use smart phones for the first round of usability evaluation. The test result revealed some usability issues. For example, participants had trouble distinguishing between text boxes, labels and buttons. We therefore replaced our original flat design with gradients and added skeuomorphism.

We conducted another round of usability testing. This time we also included the dabbawalas who have never used a smartphone. They liked that the interface was in Marathi (their local language), but they were not very comfortable with the touch interface.

In the next round we asked a dabbawala with smartphone experience to accompany them and help them learn the process gradually. At the end of the session that they were convinced that the smartphone application is helpful indeed but they would need some time to get used to it.

Pilot Run

After the initial evaluations, we did a pilot run to test our concept. We created a quick working prototype and invited 4 dabbawalas and 3 daily commuters to take part in the test run. We had six lunch homes listed in the app. We invited them to take part in our experiment. The head of the dabbawala organization was also involved and the experiment was carried out at a stretch for three days. We carried out three different scenarios viz. customer sign up, allocation of dabbawalas, ordering and delivering lunch.

The dabbawalas were first time smartphone users so we accompanied them in the journey for assistance. After the activities were over, we discussed the challenges they faced and how to overcome them. The dabbawalas still had certain difficulties in using the application. For example, using the maps to locate the customer address in a new area or assigning a dabbawala to a customer when someone signs up seemed to be a big hassle for them. As the interface was in their local language, they felt comparatively confident and the fear of technology was much less, but first time users also had trouble navigating the touch screen.

However, on the second day they appeared more confident in dealing with the problems that appeared on the first day. Since, they had trouble in understanding the whole application, they memorised bits of the application which they need frequently, like looking at the order list, navigating using maps etc.

The customers and the lunch home employees are already accustomed to using smart phones so they did not face any big problem as such.

Future Work

Future works include improvement of the interface to make it more intuitive for first time adopters and evaluating the impact of the application upon their efficiency.

Through our contextual enquiry we had learnt that most of the wives of the dabbawalas do odd jobs elsewhere to run the family and some of them even cook at other people's homes. In future, apart from partnering with other food services, a new food service

run by the dabbawalas' wives can be introduced. They can give out their tiffin boxes to the customers, keep a small refundable deposit and generate interest from bank. Since they already have a loyal customer base and a huge reputation, getting customers to their food service would not be a problem. The dabbawalas were very happy with this business model.

Conclusion

Our study explored and discovered strategies for empowering the dabbawalas with a mobile application so as to enable them to serve their customers better. For sustainable economic growth, we have often turned to mobile phone as a platform of choice [8]. After a few rounds of testing and evaluation we concluded that mobile application would indeed be helpful to the community. Subjective feedback we received from our design validation indicates enthusiasm for the application. The new design doesn't disrupt their working procedure and ensures the application is recognized among dabbawalas as a complement, not a replacement, of their traditional work culture. If adopted on a large scale, the application may improve accountability and communication among dabbawalas and food services and empower them to serve their customers better. Through partnership, they all benefit from each other and hence it develops a healthy system.

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