

DESIGN THINKING & LEAN: AN ASSERTIVE AND HUMAN APPROACH TO SOFTWARE DEVELOPMENT

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ABSTRACT

This paper aims at presenting how a Brazilian innovation consultancy guided a collaborative development of a mobile solution using the Design Thinking approach (Vianna et al, 2012) and Lean principles (Ries, 2011). It will describe tools and methods used and how it was applied to requirement gathering, analysis and specification a solution to improve the assembly service of a retail company. This case aims at shedding the light at how those approaches can be applied in other companies that have a similar scenario in order to deliver faster and more assertive digital products to support corporate processes.

INTRODUCTION

In 2013 MJV technology and Innovation – a Brazilian innovation consultancy – was hired to develop a mobile solution for one of the largest and fastest growing retailers in Brazil. After a major period of growth – when they purchased more than 260 new stores throughout the country resulting in a total of more than 740 stores – their main efforts were invested in integrating these stores with the company's original standards. That means that during post-acquisition phase the IT department had bigger priorities than to improve processes and systems that already worked. However, in that scenario a challenge regarding their assembly service process became even more evident. At the time, all assembly work order (WO) were proceeded in paper, the assembly technicians (users) had to present themselves every day in their designated assembling center to collect their OS, and any problems during their workday could not be solved in real time. In other

words, this internal service process was outdated and lacked agility and transparency.

Two years before they attempted to create a mobile app to address the main issues through traditional IT methods. However, it was not carried further due to the lack of acceptance from users and disagreements within the company's business and IT departments. This unsuccessful attempt of improving their own process was a sign that the company needed a fresh perspective in the way they conducted their projects.

MJV was hired to develop a mobile solution that could solve that challenge. In a five-week project, the consultancy team was able to gather, analyze, and specify the requirements for a well-accepted mobile app that guided the assemblers throughout their workday tasks. This result was made possible by developing the app collaboratively with the main affected company's departments and users using the Design Thinking approach (Brown 2009; Vianna et al. 2012) and Lean Principles (Ries 2011; Gothelf 2013).

Additionally there was an underlying interest in the project. Some stakeholders wanted to learn how they could apply and benefit from the approach used to develop the project as well as influence other departments and higher stakeholders in acknowledging it. In this scenario the opportunity in stake was not only to have a successful case but also to stimulate and empower the company to change.

This paper aims at presenting how this project was conducted and discuss its results regarding the use of Design Thinking approach and Lean Principles in such context. Additionally, it also comments on how the use of a design approach influenced a shift in the internal project development practices towards a more innovative and people centered approach.

IT METHODS AND THE DESIGN APPROACH

In regular software development projects the retail company would use Waterfall based methods (Gilb 1985), sequential and document-driven methods in which all planning is oriented in non-iterative steps toward a single delivery date. Though software-developing methods have been evolving for many decades now (Larman & Basili 2003), some aspects of it

still remain as a common practice in IT departments (Davis, 2012). Heavy documentation, rigid rules, and a disenfranchisement of the IT team as true business partner (Davis, 2012) are some of the barriers that prevent a more flexible, quick and assertive creation of solutions when using those methods.

In such models the solution is specified based on an exchange of documents. The client – that supposedly have the users perspective – fill a briefing document describing the software needed and IT professional would describe the functionalities to be then approved by the client. This exchange of documents continued until both sides agree on the content. That means that a project team will work based in a document and may never meet either the internal or external customer (Davis, 2012). That scenario slows the process and the assertiveness of the solution because it can promote miscommunications caused by specific jargons, delays due to the long period required to that trade of comments and lack of ownership feeling from both sides recognizable by “the problem is not in my hands anymore” behaviour. (Romero 2011)

Regarding the user involvement in the process, Larman & Basili (2003, p. 52) mention some other struggles that might happen: “A system’s users seldom know exactly what they want and cannot articulate all they know. Even if we could state all requirements, there are many details that we can only discover once we are well into implementation. Even if we knew all these details, as humans, we can master only so much complexity. Even if we could master all this complexity, external forces lead to changes in requirements, some of which may invalidate earlier decisions.”

Agile development methodologies, characterized by short iterative cycles of development driven by product features, collaboration in decision-making, incorporation of rapid feedback, claim to go a step further in overcoming these limitations of traditional plan-driven ones (Nerur et al. 2005) by relying on people and their creativity rather than on processes. Even though, it still lacks flexibility and a broader way of thinking that can be offered through a design approach (Lindberg et al 2011). Those methods still deal with user’s voice tamed by translating it in stories and specifications and don’t stimulate a diverse way of thinking in development teams, compromising a creative ideation of solutions specially by not fostering a parallel exploration of the problem and the solution at the same time. (Lindberg et al 2011)

The design approach explores both the solution space and the problem space in a diverging and converging process throughout the project. In order to maintain a broader perspective of the problem and diversify the creative potential of it, this approach relies on the engagement of a multidisciplinary team and stakeholders involved in the problem in working collaboratively in practice – not only in discussing and approving throughout the project (Clark et al 2012). The

strategies to grasp this multiple knowledge and multiple perspectives of others for the purpose of synthesizing and creatively transforming it into new service or product concepts are called Design Thinking (Brown 2009; Vianna et al. 2012).

As a means to bring agility to this process, it is possible to articulate Design Thinking with Lean Principles (Ries 2011) that advocates the creation of a minimum version of the solution (minimum viable product or MVP) and build rapid prototypes designed to test market assumptions and uses customer feedback to evolve them. Specifically relating to software development, these principles inspired Lean UX (Gothelf 2013), the practice of bringing the true nature of the work to light faster, with less emphasis on deliverables and greater focus on the actual experience being designed.

According to Bucciarelli (2000) the design process is social. It involves the contribution and collaboration amongst a variety of individuals with different interests and backgrounds. Therefore, in order to succeed, stakeholders must come together to negotiate, clarify, and harmonize their different contributions to the project. In that sense, the role of the design team has shifted from a translator between users and developers to facilitators (Sanders & Stappers 2008). It is possible to argue, then, that the use of the design approach can lead not only to faster and more assertive solutions, but also to change in relationships within the organization. To illustrate that, a case study is presented.

THE CASE STUDY

The company at stake grew by acquisition to become one of the largest and fastest growing retailers in Brazil. This strategy meant that their IT department had big integration challenges and inherited a team of employees whose majority used Waterfall based methods (Gilb 1985). Besides that, the junction of many companies created a fusion of cultures that has strong tendency to create an environment of competition which compromises collaboration.

Although the younger IT employees had some experience with Agile, the higher leaderships were resistant to change. Thus the IT department suffered from all the previously mentioned limitations inherent to documentation-driven/ plan-driven methods. Their average time for delivering minor projects was between 6 and 9 months without guarantee that the solution would actually work. This was the result of the lack of: understanding between the clients and the IT team, ownership of the project and involvement of the user.

In 2011, the company tried to solve the assembly issues internally, by making the process more digital in order to gain agility and transparency. At the time, all assembly process was paper-based, required everyday presence of the technicians in the assembling center, and there was no visibility of any problems that might happen throughout the workday. A mobile application was developed to support this shift of process. However,

as a consequence of the previously described scenario, the solution they proposed never came to be implemented. First, disagreements among departments like logistics, assembly, legal and IT created huge barriers to be crossed. For a company with their size, this change would cause some risky impacts in all those areas. Also, this struggle of forces was too much for the IT department – the main mediator of the conversation – to handle, once they were seen as a service provider without much decision autonomy. In parallel to these, the draft of the app was presented to a few assembly technicians and the acceptance was very poor, because of all the interactions needed in order to complete a simple task.

At that time, following the recent tendency in the Brazilian market (Leuzinger & Fernandes 2012), the executive board of the company started to pursue innovation. Though there was some investment in that direction, the efforts were mainly related to technological innovation and even the employees interested in innovative methodologies faced difficulties in applying them in practice. However, the stimuli and the space to pursue new projects, new tools and techniques, methods for project developments or trainings existed.

Until 2013 this scenario didn't change much. Though the retail company developed a couple of new products and services and there had been some attempts of the marketing department of promoting change by doing "innovation contests", they reached a very small slice of the employees. At that time, one of the young-generation IT employees was eager to learn more about innovation processes and how they could be used within the company. In that search, he contacted MJV and started a conversation on how they could work together. The result was the decision to work in a small try-out.

In that context, the assemble app project carried a double value for the company: a chance to develop an effective solution for their assembly process and an opportunity to experiment a new approach to the initial development of software.

The mobile app project was developed within five weeks, involved 14 different areas and 15 users from different assembly centers in São Paulo. It can be dissected into four main phases: immersion in the context, features gathering and prioritization, development of app's flow and screens and prototyping.

IMMERSION IN THE CONTEXT

At first, it was necessary to understand the projects context: the company's affected processes, relevant stakeholders, business and technological limitations, gaps, opportunities and the user perspective. In order to do so, the MJV team conducted a series of interviews with the players that were being recognized as relevant. In order to speed up the process, all the interviews were conducted with the help of a tangible tool (figure 1) to help the participant to illustrate their perspective on the

assembly process and evoke interesting stories. A series of different stakeholders and steps of the assembly process were depicted in cards and the interviewee had to describe its current experience with the process by combining the cards in a specific order. Additionally, interviews and field research using, for instance, shadowing (Vianna et al. 2012) were conducted to grasp the routine of the assembly technicians (users) and observe the assembly activities in detail.

In this phase more than 40 people were involved. Since the project had a short time-span and had the goal to develop the first MVP of the solution, this phase did not have the purpose of thoroughly understand every aspect in stake but rather gain the necessary overview to facilitate the next phases where the stakeholder would act as the specialist on those aspects.



Figure 1: Tangible tool used in interviews with stakeholders.

FEATURES GATHERING AND PRIORITIZATION

After analyzing the service process and identifying its main gaps, a co-creation workshop (Vianna et al. 2012) took place to gather and prioritize features, so participants could agree on what should be carried further. This session involved at least one representative from each affected area: logistics, transport, assembly-administration, assembly technicians, IT, security, legislation, operations and mobile.

The participants worked in mixed groups. This session started by presenting the findings from the first phase and questioning them within the group in order to build a shared understanding of how the assembly process was and what was required in a mobile solution. Throughout the activities the participants were engaged in: building the journey of the user's workday; revising this journey when presented "odd-cards" describing unusual facts, but real and often against the company's policies; taking into account other players' needs, like the consumer or the transport department, that could also be addressed in this solution; and finally brainstorm functionalities to support that process and respond to those needs. The functionalities were presented to all the participants and then prioritized. By the end of this session, the whole group had agreed on what features were imperative, thus should be addressed by the MVP, and what should be contemplated in further upgrades.

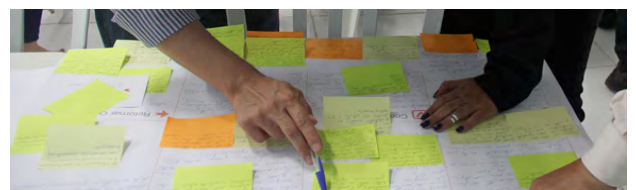


Figure 2: Features gathering and prioritization collaborative workshop

DEVELOPMENT OF APP'S FLOW AND SCREENS

After compiling the main features, the participants were invited to make sense of how they would work together. To do so the groups had the support of a large graphic of the assembly process – build by them in the previous workshop – and cards with the description of each selected feature. After agreeing of how they should work within their groups, the participants received a “screen-kit” – mobile paper frames with a set of printed common screen elements – to think and tangibilize how these features should be presented. This process helped to identify gaps in the usability of the app and even on the established flow.

After developing all the agreed necessary screens, the groups build rough navigable prototypes (Vianna et al, 2012) by photographing the screens and creating their links through a prototyping mobile app. At that moment the assembly technicians present in the session played their own role, testing each groups prototypes. At last, the prototypes were presented and according to the feedbacks all the participants elected the most appropriate flows and screens of the app.



Figure 3: Development of screens: the “screen-kit”.

PROTOTYPING

With features, flow and screens draft established, MJV-team synthesized the app version into a paper prototype (Vianna et al 2012) and ran test sessions with the users regarding different scenarios of use. In that phase, were addressed issues regarding the compatibility with that solution with the real work routine, freedom of use, consistency, mistake preventions, flexibility, efficacy in usage and in aiding the process and documentation.



Figure 4: Prototyping phase: paper prototyping.

After three quick iterations, according to the participants' feedback, the prototype evolved into a web-based working high-fidelity prototype of how the MVP of the app should be. This developed version served not only as a tangible model, but also as part of the documentation/ specification of the solution.

RESULTS

After the project was delivered the company started to develop its first version. Together with the

specifications and the MVP of the solution, MJV delivered its future vision – including the incremental features idealized by the stakeholders – and an adhesion plan suggesting that the solution should be introduced to the users in cycles. First a small and controlled group should adopt it, to then become propagators in the next cycle, multiplying the power to spread its usage. Today, after every cycle is completed, the IT department collects feedbacks and iterates the solution. The results are presented to de directing board.

Six months after this solution started being implemented – and in use by more than 250 technicians – the company already noticed practical results. The average assembly per day rose from 4 to 9 and the client waiting-time for this service dropped from 30 to 22 days. According to the established Key Performance Indicators (KPI) the productivity of the employees increased more than 50%.

Those results are promising and show that the solution developed indeed addresses a great range of gaps that existed in the assembly process. However, it is also very interesting to highlight the underlying impacts brought by the project. In that sense it is possible to present them according to the two different spheres of impact: the retail company and MJV and its design team.

IMPACT WITHIN THE RETAIL COMPANY

As previously mentioned, since the design approach is a social process, the impacts that this project brought was not only felt in the assembly process, but also in the employee's relationships and internal development processes. After one year of the project being delivered, a great movement towards a more innovative and people-centered approach has been emerging in practice. This project is recognized as a great driver of this internal shift by the organization. In the next paragraphs some evidences of this change are described.

The first clear impact emerged in the group of participants engaged in this project. After the five weeks of collaborative work they became advocates of their own solution, and not only stakeholders. It means that the relationships that in the past were a struggle of incompatible interests became a group of joined forces towards a common vision.

In that scenario, since the IT department started that movement, it began to be recognized as common point among the businesses areas, a facilitator of the process of creating solutions, and no longer as a manufacturer of technological products. Proofs of that shift are:

The IT department started using the techniques learned in other projects, impacting other areas.

Business departments that were never involved in previous projects “heard” about it and started asking IT-employees to help them in projects that didn't relate necessarily to technology

In a recent interview with one IT project manager, it was possible to notice a difference in his speech: he

recognized his role as a facilitator between the involved areas of the company and not as a “software-developer”.

In addition to those signs, an even greater effect could be highlighted. Since the design approach foster the opportunity of integration between stakeholders from all levels of the company, a bridge was built between who once was seen as a very low level employee, the assembly technicians, and the highest level of the company, the executive board. Today, every presentation of the mobile solution results to the high leaderships is not made by a leader-representative but by the very own end-user: the assembly technician.

IMPACTS TO MJV & LESSONS TO THE DESIGN TEAM

The design team as an external player that is not involved in the internal politic-environment showed to be a better player to act as a facilitator, as they can be neutral, have a naive look to ask difficult questions and make connections that lead to a final successful solution.

To make a real change within the company is not enough to have an effort in only one direction – normally top-down. By “demanding” people to change, the leaderships won’t achieve a successful result easily. As the results of this project showed, it can be a better practice to stimulate change, not just as top-down movement, but also open space and empower employees to build relationships bottom-up.

DISCUSSION

Design thinking approach with lean practices can help companies develop new technological solutions that meet end-users’ needs and bring financial results in a shorter timeframe and with more assertiveness as it involves multiple stakeholders early in the project. This way they feel heard and empowered, participate in the iteration phases, and own the final solution. The social dynamics fostered by this process can lead to greater changes and impacts in the internal/political relationships among the company’s departments.

However, through a software development perspective, the documentation of the development solutions is not as precise and comprehensive as required. Nonetheless, this is an expendable deliverable when agility is needed and considering that the solution must be always in constant evolution.

In a five-week project to build a MVP to tackle a complex issue it is inevitable to tame some of its aspects in order to keep the rhythm of the project. Design Thinking relies on a diverging and converging process of exploring problems and solutions. However, in such a short time-span, this project showed that the great challenge of this process is the balance between those movements: how to build a focused and specific solution for the assembly process, the MVP, that still results from a broad exploration of the creative potential around that issue?

Regarding that matter this project brought to light some valuable insights. During the immersion phase, the use of tangible tools during interviews showed to be a successful way to keep the issue tamed and still allow the interviewees to share related stories. Since each card carried an image related to the process, the participant would tell his experience inspired by those pictures. However if the cards didn't afford those stories, the interviewee was stimulated to draft new pieces that would later be incorporated in the deck. There is no way of assuring that there was space for sharing all the meaningful stories regarding the investigated issue, but this tool showed to be a useful “red thread” for the interviews that guaranteed some degree of divergence to the findings.

Beyond engaging all the stakeholders, creating a multidisciplinary environment, and a shared understanding and agreement on the work, both workshops played a fundamental role in maintaining the rhythm of the project. They showed to be a valuable moment to share the findings of the previous phase, open a discussion about it if necessary – the ultimate opportunity to diverge on that topic – and after, focus the attention on the most relevant issue. All of that accomplished through practical activities, a key factor to have an assertive and productive session. In that way, the workshops were also the perfect moment to converge insights, ideas and decisions in the course of creating the minimum viable version of the app.

At last, the delivery of the MVP model showed to be more than a minimum version of the solution to be implemented. It acted as a tangible clue of the project for the stakeholders of all levels to hold on to. Though it would still need iterations to perfect it, having something done – even a small part – maintained a common ground among the stakeholders to argue for the project. That gave more chance for the idea to be developed further and not end up “in the drawer”.

When it comes to designing, it is impossible to guarantee equal results in different projects. Since the design process is social, it is possible to say that the outcome will depend mostly on the people involved. The work presented here is an attempt to share ideas of what could also function in similar projects. However it is our understanding that any followed suggestion should be adapted to specificities of those future projects. Nevertheless, we hope that this can inspire further explorations of the use of Design Thinking and Lean Principles.

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