Process and Challenges in Designing Data Registration via File Import in an Administrative e-Commerce System

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Abstract: This article presents the full account of a case study within VTEX, a Brazilian e-Commerce company. It reported the design challenge to conceive the functionality for importing records via a spreadsheet file. Several techniques of Human-Computer Interaction (HCI) and User Experience (UX) were applied within the Double Diamond design process, such as CSD matrix, ideation techniques, user stories, interaction diagrams, prototypes. In this document, we report how each technique was applied and present the results obtained from them. The results of the prototype usability test with user representatives are also presented. Some lessons learned, from this case study, were: to keep the design process iterative, exchanging techniques whenever necessary; to involve team members so that everyone is on the same page regarding the problem and the solution; to test the solution as soon as possible while still in prototype, even if it is not with end users but with their representatives.

1 INTRODUCTION

In general, an electronic commerce (e-Commerce) system allows any transaction using electronic means Assunção (2019). This type of technology aims to support buying and selling over the internet Loh (2014). For an e-Commerce system to function properly, at least for large companies, robust platforms are necessary to store, process, and exchange information at scale Assunção (2019). VTEX [1] is a Brazilian multinational company specialized in e-Commerce, offering solutions in the areas of marketplace, omnichannel, payments, conversations, and extensions to streamline integrations and development. These solutions enable its customers to manage their online stores and tap into new growth opportunities through the various products and services they provide.

Among the various products offered by VTEX, there is Sales App. This product is the primary solution for unified commerce. It allows for the integration of online and physical sales channels, placing a greater emphasis on customers by putting them at the center of the purchasing process[2].

Sales App operates through two fronts: a mobile application and a web-based administrative system. The mobile application is designed for salespeople to carry out the entire sales and purchase process in physical stores with customers. Salespeople can assist store customers in choosing the best products and even finalizing the payment. The web-based administrative system is aimed at store managers, allowing them to manage salespeople and physical stores data through an administrative dashboard. Managers can register new physical stores, add new salespeople, and also analyze the performance of physical stores and salespeople in terms of sales metrics.

This article presents the efforts of the design team that concentrated on enhancing part of the web interface of Sales App. The primary objective was to simplify some crucial tasks for physical store managers. The proposed solution allows importing salespeople or stores massive data from a spreadsheet, providing greater efficiency during registrations, significantly improving the user experience and the adoption of the solution. While the act of importing files is a common feature found in systems that involve registration, developing this functionality within the context of Sales App necessitated several design activities to create a prototype proposal. Therefore, this article presents a whole case study using the Double Dia-

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[2] https://help.vtex.com/en/tracks/instore-primeiros-passos-e-configuracoes–zav76TFEZlAjnyBVL5tRc

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mond design process for this kind of bulk registration of salespeople and stores in application.

2 BACKGROUND AND RELATED WORK

Human-Computer Interaction (HCI) is a discipline interested in the design, implementation, and evaluation of interactive computer systems for human use, along with the phenomena related to that use (Hewett et al., 1992).

This field defines certain quality criteria, such as usability, efficiency, communicability, accessibility, and user experience (Barbosa and Silva, 2010). However, capturing and including usability requirements are an often challenge regarding HCI practice (Ogunyemi et al., 2019). The works mentioned in this section seek to encompass the most common types and challenges of research involving HCI and the e-commerce industry.

2.1 HCI and Industry

Many researchers are dedicated to investigate problems and challenges related to the 'industry/academia divide' (Goodman et al., 2011; Melo, 2012), often exploring the factors involved, proposing solutions and describing good practices and examples (Goodman et al., 2011; Gray et al., 2014; Roedl and Stolterman, 2013; Stolterman and Pierce, 2012; Thies et al., 2015).

Bim et al. (2019) recall that the synergy between university and the job market is one of the objectives of GrandIHC-BR Challenge 5: Training in HCI and the Market. In their work, the authors present an example of articulation between a Human-Computer Interaction Evaluation undergrad course with a demand from the industry that provides services to a municipal government. The results of the evaluation done by students were shared with the company that provides services to the city hall and the necessary corrections were made. Mesquita and Darin (2021), in turn, aims to support the training of HCI and Design professionals through Orbis, a toolkit composed of 15 cards that guide the application of user-centered techniques commonly used in Academia and Industry, in the planning, design, and prototyping stages. Other academia/industry integration initiatives are: Kamaruddin (2018), Nascimento et al. (2019) and Anirudha (2007).

Another strand of research is dedicated to investigating the different uses, applications, and effects of HCI and UX concepts, methods, and techniques in real industry contexts. In the literature, several practical reports are presented, especially about the application of different research methods to evaluate the UX of different systems. Damian et al. (2022), for example, present a report on the activities carried out in evaluating the UX of mobile devices using the Dogfooding approach, which proposes that company employees use their own products or services in their daily lives (Harrison, 2006). The authors therefore discuss some practices applied by experts in UX evaluation, with the support of the Dogfooding approach, at the Eldorado Research Institute, together with the Motorola partner.

As done in this article, some authors dedicate themselves to detail the entire HCI and UX design process in real industry environments and systems, describing the steps taken and the artifacts built, such as the work of de Oliveira et al. (2022), Munim et al. (2020), Silva and Lotthammer (2019), Lazaris and Vrechopoulos (2014) e Culén and Kriger (2014).

2.2 HCI and e-commerce

The success of an e-commerce website is greatly influenced by the quality of its design (Nathan and Yeow, 2011). Therefore, since the first e-commerce systems, HCI and UX researchers have been investigating how this field can contribute to good online shopping experiences. Research involving HCI in the context of e-commerce is the most varied, covering topics such as virtual reality (Wu et al., 2023; Orso et al., 2023), artificial intelligence (Liang et al., 2023; Bawack et al., 2022), chat bots (Hsu et al., 2023), social selling (Khan and Shaw, 2019) and gender (Cao et al., 2023).

Mu (2021) studied the non-linear relationship between product performance and user satisfaction, demonstrated the competitive advantage of user demand research for the design of e-commerce apps, and discussed the role and significance of user research in the design of e-commerce apps from the whole product operation level.

Also, scholars have proposed that although usability remains crucial for effective Web site design, it is no longer the primary distinguishing factor (Chu et al., 2014). A thriving e-commerce Web site should be capable of instilling trust, captivating and involving customers, and convincing them to make purchases (Patton and Jøsang, 2004; Chiu et al., 2023; Chak, 2003; Jones, 2011; Winn and Beck, 2002).

Much of the HCI research on e-commerce is dedicated to the evaluation stage (Yang and Chiu, 2023; Chiu et al., 2023; Pu et al., 2008; Belk et al., 2014; Djamasbi et al., 2014), but it is also possible to find

works dedicated to design activities (Hangrui, 2023; Monteiro and Gonçalves, 2021; de Oliveira et al., 2022).

Some research more aligned with Sales App's e-commerce context, involving interactive systems for physical stores, are: Lazaris and Vrechopoulos (2014) and Obermeier and Auinger (2019)

The e-commerce product described in this case study focused primarily on usability (mainly efficiency) and user experience criteria to shape the entire design solution. Therefore, the HCI quality criteria guided us throughout the development of the solution. Furthermore, to meet these criteria, efforts were made to incorporate user needs into the solution development process, aiming to create a useful functionality.

3 PROJECT CONTEXT AND MOTIVATION

Before Sales App was made available, the configuration of data for physical stores and salespeople was a challenge for store managers because managing multiple registrations has been time-consuming and laborious. Initially, store managers used a solution with a spreadsheet-based interface to register physical stores and salespeople. This solution was problematic because it lacked field validation, was not easy to use, and required technical knowledge, resulting in a time-consuming process. These factors led to many users (store manager) to open support tickets with the company.

Faced with these factors, the product team had the opportunity to develop a solution to replace this rudimentary registration method, aiming to provide more flexibility in the registration of salespeople and physical stores, making the process more efficient with less need for assistance and fewer errors. This opportunity led to the development of Sales App, the solution designed to assist store managers in registering salespeople and physical stores more efficiently without requiring technical knowledge from them.

Despite the significant improvement in the registration process, later on, the team identified a friction point in the user experience during the salespeople and physical stores registration process. When managers needed to register multiple salespeople or physical stores, the registration process proved to be time consuming and inefficient, although much easier to use than the previous solution. Currently, registration is done store by store or person by person because the system does not allow for bulk registration. Then, the product team could further enhance the registration process in the current solution.

To address this friction, the team embarked on developing the import functionality. This type of feature already existed in other products of the company; however, it was quite technical and most focused on efficiency and robustness, with little attention to use quality and user experience. On the other hand, the Sales App design team aimed to develop a functionality that prioritized use quality, focusing on the user experience, while not neglecting robustness and efficiency in terms of internal quality of the system.

4 DESIGN PROCESS

To address the design challenge presented in the above sections and structure the solution-thinking process, this case study used the Double Diamond design process in conjunction with Design Thinking techniques.

Double Diamond process succinctly outlines the steps of a designer's work (Tim Browne, 2023). This process provides a flexible framework with an emphasis on problem understanding, continuous iteration, multidisciplinary collaboration, and user-centered focus. The Double Diamond comprises four stages: discover, define, develop and delivery.

Design Thinking, on the other hand, represents the way design is conceptualized and integrated into each stage of the design process (Ambrose and Harris, 2016). These stages demand designers to have a project and user-focused mindset Kalbach (2016). Figure 1 illustrates the techniques carried out at each stage of our own process and their respective objectives.

The discover stage, following a divergent approach, aims to fully understand the context of the product, identify the problem being addressed, discern user needs, explore the environment, define the scope, and pinpoint challenges and opportunities (Tim Browne, 2023). We have applied several techniques in this phase: Briefing, CSD Matrix, analysis of internal and external products, competitor analysis, and user journey.

Briefing Ambrose and Harris (2016) is a document that aims to map out the context, objectives, expected goals, and document the decisions made at the beginning of the project. CSD Matrix (LiveWork, 2023) is a tool used to map the team's doubts (D), assumptions (S, from "suposições" in Portuguese), and certainties (C) regarding the problem. The user journey (Kalbach, 2016) is a visual map depicting the user's journey when facing that problem. The user journey analysis mapped out the phases, stages, actions, and opportunities for users. The analysis of

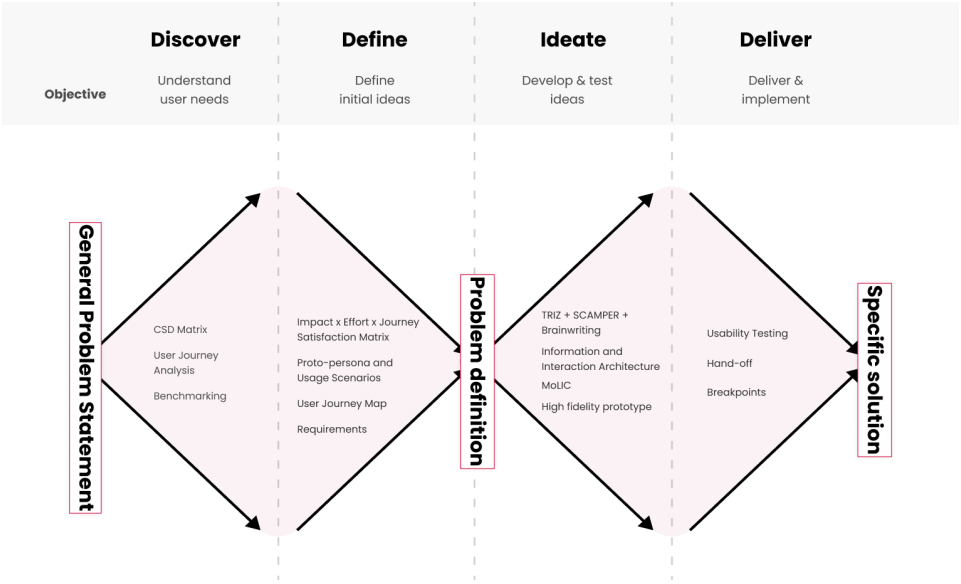

Figure 1: Double Diamond process and the artifacts applied to this project.

similar products (Pazmino, 2015) is a technique used to explore internal or external products that partially address the problem, typically those offered by competitors.

The define stage, following a convergent approach, aims to refine and specify the problems to be addressed by the team based on the data collected in the previous phase. With knowledge of the problem, the goal is to define a design proposal. This stage is a moment of assessment, prioritization and definition of all the ideas generated in the previous stage (Tim Browne, 2023). In this case study, the following activities were conducted: to define requirement, proto-personas, use scenario and user journey map; and to carry on an ideation workshop combining three techniques: TRIZ (Alexandre Alcaraz, 2023), Brainwriting (MJV Team, 2022), and SCAMPER (MJV Team, 2022) to generate design ideas by the collaboration between the design and engineering teams.

Proto-personas enable the representation of a user group through a fictional character and help the team stay focused on user needs. Unlike personas, which are based in field research, proto-personas are based in desk research and suppositions (Mara, 2020). A use scenario (Barbosa and Silva, 2010) is a way to describe a usage context with a specific system or in the face of a problem involving an actor. The user journey is a visual map that seeks to represent all user touch points within an experience (Kalbach, 2016). Concerning the creativity techniques applied in the ideation workshop: TRIZ is a structured method for creating; brainwriting is a technique in which participants express their ideas by writing; SCAMPER is an acronym to Substitute, Combine, Adapt, Modify, Propose, Eliminate, Rearrange. It provides a structured way to help think outside the box and improve the current knowledge.

In the develop stage, following a divergent approach, is the moment to address the problems defined by the team and achieve the ideal system state through experimentation, diversity of ideas, and collaboration with other team members (Tim Browne, 2023). In this stage, the following activities were conducted: information architecture modeling (Garrett, 2003), interaction modeling with MoLIC (Barbosa and Silva, 2010), error message development, and interface experimentation.

Regarding the techniques executed, information architecture modeling (Garrett, 2003) assists designers in planning how information will be organized in relation to other information, considering hierarchy and the way information will be presented to the user. Modelling Language of Interaction as Conversation (MoLIC) enables the modeling of system interaction from the perspective of a conversation between the designer and the end user (Barbosa and Silva, 2010).

In the final stage, test and deliver, the design team deliver the artifacts developed and test the prototypes created (Tim Browne, 2023). In this stage, the following activities were conducted: hand-off, usability test, and improvements to the prototypes.

Regarding the activities in this stage, hand-off involves creating delivery documentation that details the interaction flows and interface components developed. Usability test Barbosa and Silva (2010) is a method of placing the user in a controlled environ-

ment to obtain qualitative and quantitative data regarding their interaction with the interface.

The design process occurred in an iterative and flexible manner, with no requirement to fully complete one stage before moving on to another. Therefore, when the team identified the need to revisit a stage they had already passed, they did so.

5 DESIGNING REGISTRATION VIA FILE IMPORT

5.1 Discover: the Phase to Understand the Users and the Problem

In this phase, a CSD Matrix was created to map out what the team knew and what still needed to be discovered about the problem. In the initial version, there were 4 certainties, 3 assumptions, and 10 doubts identified. Subsequently, some doubts and assumptions were resolved and became certainties, resulting in a total of 11 certainties, 2 assumptions, and 8 doubts. For example, one of the doubts that turned into a certainty was regarding the file extension to be used for spreadsheets, such as whether the ideal extension would be csv, xls, or xlsx. The team decided that the file extension allowed in the import feature would be csv and xlsx. The doubts and assumptions that arose during the project were addressed through meetings with the engineering team, which included a team member with a deeper understanding of the problems and users.

Then, the user journey analysis Kalbach (2016) was conducted. For this case study, the journey focused on users (store managers) registering stores and salespeople. Through the journey analysis, two opportunities were identified: a) importing stores and sellers via spreadsheet file and b) guided configuration, which provided step-by-step instructions within the interface.

After gaining a deeper understanding of the problem and the user journey, an analysis of external and internal products Pazmino (2015) was performed to understand the universe of existing solutions that address the problem. The analysis involved searching for products that had import functionality, both internally and externally, based on products like the Sales App. To find external products, we focused on competitor companies, and for internal products, the Help Center was explored using keywords such as ‘import’, ‘bulk registration’, ‘spreadsheet’, with the goal of finding known solutions with similar functionalities. Additionally, the import functionality within the company’s platform was investigated. With the identified products, the aim was to understand: 1) the user interaction from the beginning of the import journey to the end; 2) import resources; and 3) the design patterns used. For the analysis of similar products, four internal VTEX products and five external competitor products were examined. These products involved importing and/or exporting data through spreadsheets. For each of these products, their functionalities were mapped, along with how users interacted with them.

This analysis revealed that some products had relatively simple import processes, while others offered a wide range of features, such as product filters and the ability to update existing records in the system. This in-depth analysis allowed us to identify best practices and relevant features that could be incorporated into our solution.

5.2 Define: the Phase to Define the Problem and the Proposal Value of Design

With the problems identified in the previous stage, the solution requirements were modeled. These requirements helped transform abstract feature ideas into tangible entities through user stories (Vazquez and Simões, 2016). User stories were written using the card, conversation and acceptance model. This format was chosen for the following reasons: ease of maintenance, understanding, modification, and measurability. The analysis of external and internal products helped define the essential requirements for the import feature. Initially, 9 user stories and 20 business rules were defined.

The team realized that they could generate more feature ideas and user stories to ensure robust functionality that would provide a good user experience. Therefore, an ideation workshop was conducted through an online meeting with 10 participants and a moderator to encourage everyone to contribute their ideas. The workshop steps are described in Figure 2.

In the first stage, the team carried out the activities listed in Figure 2 to align the team on the problem and stimulate creative thinking, drawing on TRIZ concepts. Defining the problem ensures alignment among all participants. Subsequently, they listed the problems contradictions, which consisted of conflicting or mutually exclusive requirements. Identifying these contradictions can aid in eliciting requirements and ideas. For the following activities, the team collectively established what the ideal state of the system would be. For instance, one statement of the ideal state was “In terms of the interface, it should be simple, sequential, and user-friendly.” After these

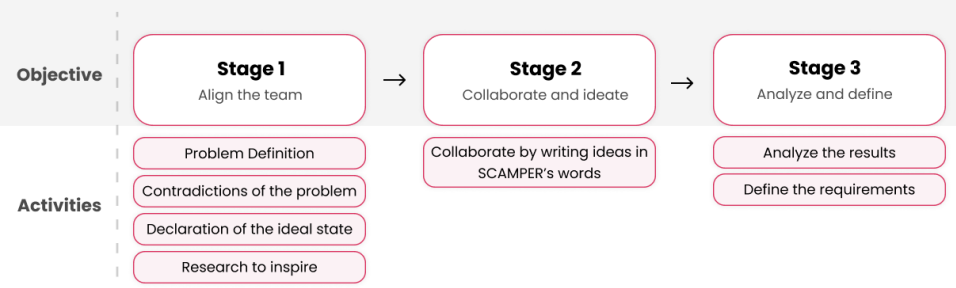

Figure 2: Stages of dynamic with team using TRIZ, SCAMPER and Brainwriting.

statements, the team was encouraged to search for visual references from images provided on other existing systems.

In the second stage, as shown in Figure 2, participants were invited to collaborate using the SCAMPER technique. Each participant had 2 minutes to contribute to each of the words in the technique. The session moderator timed the intervals, and, when the minutes allocated for each word ended, he guided the participants to move on to the next word. All participants went through all the words and contributed ideas to enhance bulk import. The participants had contributed 34 ideas of requirements or design guidelines for the interface. Following the contributions, there was a discussion among participants about the ideas, and they voted on the best ones, for example, "Import and be able to view and edit spreadsheets in the interface itself". The third stage was dedicated to analyzing the results and modeling the requirements, carried out solely by the design team. By grouping ideas by affinity, we define new requirements that encompassed the ideas of all team members.

The ideation workshop enabled the definition of requirements and meeting the statements made by the team. With these ideas, the interface design had parameters for which paths to follow to meet the ideal state defined by the team during ideation, such as "To show the user successes and errors only after the import conclusion". After the analysis, 34 user stories were defined, an example of which is "As a store manager, I want to download the system's CSV template so that I can fill it out". However, as a decision on what to prioritize initially, not all user stories were selected for development; the user stories that were not prioritized were reserved for a later stage.

Once the requirements were outlined, a proto-persona and a use scenario were defined for the project; which inspired the design of the user journey for the new Sales App registration. The journey mapped out the phases, actions, thoughts, feelings, ideas, and opportunities. A critical point highlighted in the journey was the moment when the user received error feedback if they had made a mistake in the spreadsheet fill.

5.3 Develop: the Phase to Address the Problems Defined by Team and to Prototype Solutions

Among the team members, the functionality was generally referred to as 'bulk registration', but it was not clear whether users would understand this term. Therefore, an analysis was conducted to see how internal products of the company with import functionality referred to it. In addition to internal products, external products from competitors were also reviewed. Among the various options, the functionality was named 'Import Sellers' and 'Import Stores'.

To organize the information within this functionality and make it easier for users to understand, the information architecture (Garrett, 2003) of the functionality was conceptualized. Using a hierarchical approach and a top-down method, it began by designing a major category followed by smaller parts of the information. Diagrams were used to create the information architecture. Initially, a draft was made of how the information, including titles, input fields, action buttons, error messages, would be arranged within the functionality. However, after discussions among the design team, it was decided to switch from using the information architecture diagram to the MoLIC interaction diagram (Barbosa and Silva, 2010).

With MoLIC, designers could model the interaction and information of the system as a conversation between the designer and the user. By using the tool, designers didn't think of the solution as interfaces but as a dialogue between systems and users. This approach allowed for visualizing the whole user's interaction with the system and organizing the information without worrying about interface details. MoLIC resulted in two diagrams, one for physical stores and one for sellers. Each of these diagrams led to 8 scenes, representing the main conversations between the designer and the user, defining the user's interaction

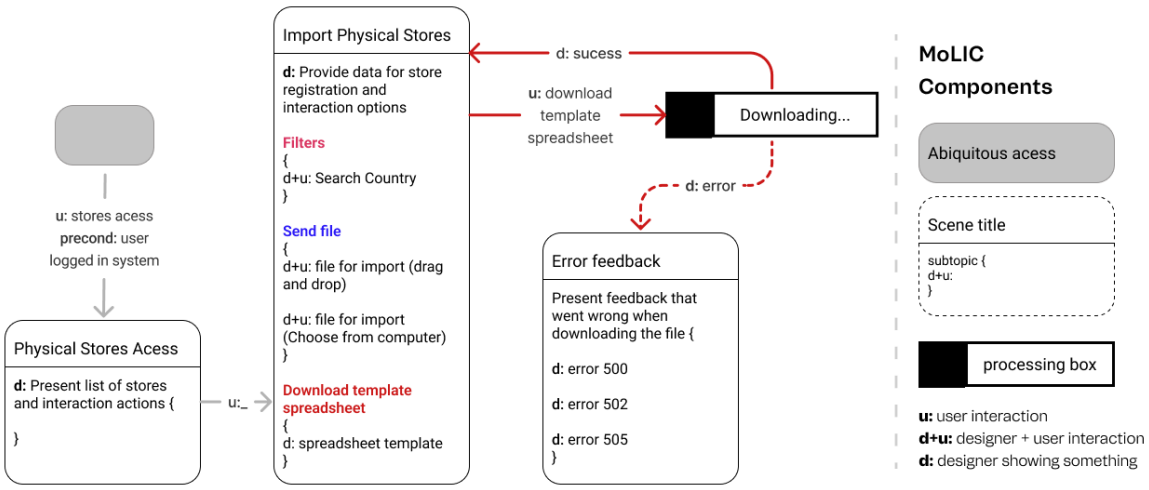

Figure 3: Example of a MoLIC interaction diagram.

flow with the system. An example of the MoLIC interaction diagram can be seen in Figure 3 and presents only a portion of the entire system interaction modeling.

With the interaction modeling completed, we developed success and error messages that provided users with feedback on the system's status and guidance to recover from potential errors. One insightful point was realizing that error messages were the primary form of assistance users would have during the import journey, so they needed careful development.

The messages had to be clear, assisting users in diagnosing possible mistakes they had made, in accordance with the company's tone of voice. The messages were created for field validations during import, fields in each row of the spreadsheet, and success messages to guide the user as much as possible regarding inconsistencies and the need for corrections. In terms of error messages, the design team developed 2 success messages, 33 error messages for physical stores, 16 error messages for sellers, and 7 field validation messages. An example of an error message developed for sellers: "The name must be at least 3 characters long".

With the foundations in place, it was possible to proceed with the development of high-fidelity prototypes, using Figma and following the Company X Design System. With the support of the Design System, the project's design team could focus more on solving how the interface solution would address the issues identified in the earlier phases.

During this phase, three different versions were created by the team to arrive at the ideal version that would provide users with a smooth and frictionless experience when importing sellers and physical stores. With the first version of the functionality prototype, it was observed that the layout of elements in the prototype version might not be the most suitable. In the second version of the prototype, testing was conducted for use cases in which multiple error messages appeared, to assess how the information would appear in the modal component and whether it would overload the user interface. The second version, after debate with the team, proved to be less suitable as it required more white space to assist users in processing information more easily and without overwhelming them. As can be seen in Figure 4, in the second version, a modal element was used as a design solution, but after discussions and test results, the team decided to use a full-screen interface (with its own route). The third version of the prototype incorporated more white space to avoid overwhelming users with error messages and featured a full-screen interface, as shown in Figure 4.

5.4 Test and Deliver: the Phase to Validate Prototypes and Ideas

While the development team was working on the implementation, the design team planned a usability test to assess and validate the developed solution with user representatives. The usability test followed the steps outlined in Figure 5.

The first step involved presenting information about the test and collecting consent forms. It was made clear that participants had the autonomy to interrupt the evaluation at any time. Additionally, permission was sought to access data records, publish evaluation results, and inform about the assurance of anonymized data. A pre-test interview with participants was conducted to gain a deeper understanding

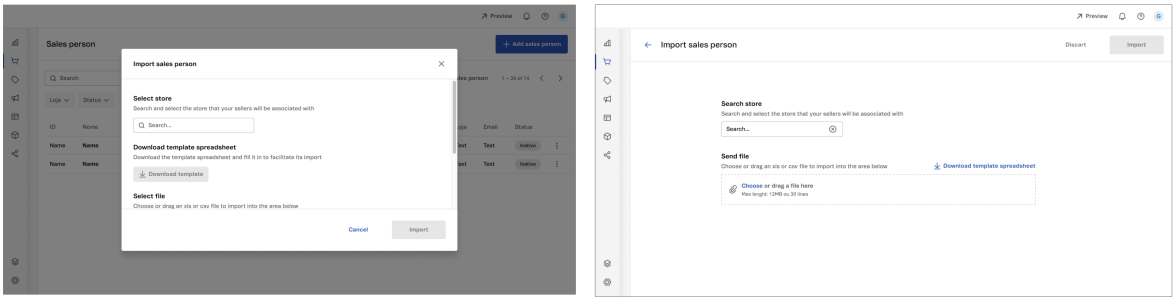

Figure 4: Some versions of the Figma prototypes.

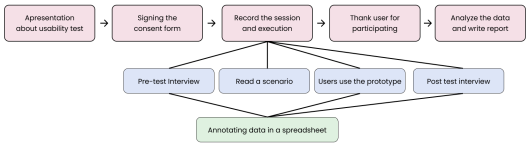

Figure 5: Steps of Usability Test.

of their experience with the product, their role in the company, and their proximity to users. The moderator provided context for participants to imagine themselves in a scenario where the manager of a specific franchise store did not have enough time to complete necessary records in the solution. In this case, the session participant would be responsible for recording physical store and salesperson data. A post-test interview was conducted to gather user opinions on the prototype that had just been tested.

For the usability test, user representatives were involved. Lazar et al. (2017) and Salminen et al. (2022) argue that it is not ideal to involve user representatives as a source of information for end users during the design process. However, in cases where access to end users is limited, involving user representatives can be an alternative. User representatives can act as information providers about end users, describing potential needs and usage contexts. Thus, the design team planned to conduct the usability test with company employees who were close to actual users and had a solid understanding of the user journey within the solution, especially regarding pain points.

The decision to involve user representatives was made because the end users of the solution were not accessible due to scheduling conflicts. Test participants, acting as user representatives, suggested improvements that could assist store managers in their routines. The test was conducted with 3 representatives who were frequently in contact with end users. The participants profiles can be consulted in Figure 6. P1 had a better understanding of the commercial aspect, and P2 and P3 had a deeper technical knowledge of the application.

The usability test aimed to verify their understanding of the import solution and collect feedback on how the solution could help store managers. One of the key points emphasized by the design team was that the solution was for store managers. The role of user representatives was to provide improvement points based on the issues and challenges reported by end users (store managers) to these representatives.

The usability test consisted of 5 tasks, namely: T1: Registering the physical store; T2: Registering 8 new salespersons; T2.1: Using the function to register multiple salespersons; T3: Downloading the available template spreadsheet and opening the file; T3.1: Observing how the spreadsheet functions; T3.2: Filling in the remaining data on the import screen and importing; T4: Correcting the described errors; T5: Resubmitting the file to the system to register all salespersons and ensuring there are no errors in the file.

On average, participants took 6 minutes and 43 seconds to complete all tasks. Regarding success rate, tasks T2, T4, and T5 resulted in 100% success without assistance; tasks T1 and T3 had some instances of success with assistance; and only P3 had partial success without assistance while performing T3. In terms of other established metrics, there were only 3 errors and 3 requests for assistance in total. 7 provides detailed results of the usability test for each participant and task.

At the end of the test, participants responded to a post-test interview. When asked about their impressions of the interfaces they had just tested, they mentioned that they were clean, intuitive, and had clear error messages. Participants stated that they did not encountered any difficulties in the import journey and did not observe any negative aspects related to this functionality. They emphasized that this new feature would be a positive point, as it would help streamline the manual registration process. When asked about potential improvements in the solution, participants highlighted the need for some help documentation for end users to consult the requirements and preconditions of each field. Based on these improvement sug-

Participant	Relationship with end users	Experience with the solution	Experience when registering a seller	Experience registering multiple sellers
P1	Accompanies the customer in commercial matters	More experience in the commercial side of the app	It used to be worse, today it is much better	Haven't had that experience yet
P2	Accompanies store managers to resolve technical problems	Experience in solution architecture	It is very manual, it could be more eficient	Leave it to the store manager to resolve this issue
P3	Accompanies store managers throughout their journey	Experience in implementing the solution with customers	There are some bugs and confusing fields	Guides how to do it via API but with the help of some expert person

Figure 6: Profiles of representatives users.

	Task 1				Task 2				Task 3				Task 4				Task 5			
	Er.	He.	Su.	Time	Er.	He.	Su.	Time	Er.	He.	Su.	Time	Er.	He.	Su.	Time	Er.	He.	Su.	Time
P1	0	1	SA	01:56	0	0	S	01:23	0	1	SA	02:55	0	0	S	00:50	0	0	S	00:26
P2	1	0	S	01:50	0	0	S	00:34	0	0	S	02:08	0	0	S	00:51	0	0	S	00:16
P3	1	1	SA	01:21	0	0	S	00:15	1	0	PS	00:40	0	0	S	03:31	0	0	S	00:20

Legend:
Er. = Number of errors; He. = Number of help requests; Su. = Success rate; S = Success without assistance; SA = Success with assistance; PS = Partial success without assistance

Figure 7: Results of the usability test for each participant and task.

gestions, the design team worked on enhancements to the prototypes, such as adding a help pop-up and documentation with prerequisites for each field so that end users could refer to it when in doubt about the spreadsheet fields.

6 DISCUSSION AND FINAL REMARKS

Designing to create a good user experience can be a complex challenge. While the import functionality may not be complex in terms of interface design, when developed with a focus on providing a clear and consistent system status, a significant challenge is added. Initially, for a system to provide clear feedback, it was essential to allocate time to develop error and success messages that offer sufficient assistance to help the user recover from errors. It was also crucial to align ideas between development and design teams, as well as meticulously map the functionality's goals to meet the company's needs. In addition to these issues, it was important to dedicate time to think and find alternatives when there is no direct access to end users.

The design process and the HCI/UX adopted techniques were fundamental to designing for a good user experience. The discovery phase helped understand the state of the problem and identify the ideal points to address. The defining stage helped engage the team in ideation workshop and to understand different viewpoints on the problem, allowing the collection of important insights that influenced solution modeling and requirement definition. In the development stage, MoLIC allowed the team to design the interaction. Not focusing on the elements of the interface was initially challenging, but dedicating time to develop error messages was crucial, as these messages would be the primary way to help users during the import journey in recovering from possible errors. Developing high-fidelity prototypes using the company's design system was important to validate ideas and allowed for changes without significant costs. In the final stage, usability testing allowed designers to understand certain aspects related to the distribution of elements in the interface and user interaction with the solution. This, in turn, influenced interface improvements.

The lessons from this case study address the challenges of the design process, particularly during the discovery and testing stages and the involvement of solution users in these stages. Design processes, especially the Double Diamond used in this case, emphasize the importance of directly involving end users to understand their pains and provide a variety of design techniques to be used during the stages, always keeping solution users in focus and designing for a good user-centered experience. However, this case study found limitations in accessing end users at that

time, meaning that even with design team efforts, it was not possible to directly involve end users in design research activities, as emphasized by design processes. Thus, one of the design team's questions was: Who should we involve during the design process to discover the needs of solution users? In addition to this question, the team reflected on: What alternative design techniques could be used due to limitations in accessing users?

To address this limitation and still develop a product that took into consideration end users, user representatives were involved during the research and evaluation stages. They collaborated by providing information about end users, the context of solution use, routine activities, and points of need. Involving user representatives was a challenge because some techniques had to be adapted. For example, during usability testing, it was necessary to consistently emphasize that the solution was designed for store managers. We always asked user representatives to share what they thought would help end users.

This case study is far from questioning the design process and its effectiveness but aims to reflect on alternatives when it is not possible to follow a linear design process and use data collection techniques with end users, as commonly presented. Thus, we emphasize a first lesson: the design process may not be linear, and some design techniques may not be the most suitable for the project, depending on the context. It is necessary to always evaluate the reasons behind those techniques and collaborate with people outside the design team to obtain different views of the artifacts, to avoid wasting unnecessary energy on something that will not work properly and can be set aside when perceived that they will not bring much value to the project.

Another lesson learned by this case study is the possibility of learning about interface patterns, interactions, and mental models of end users through the analysis of internal and external products related to the solution being developed. Since it was not possible to talk to users about their needs, this case study carefully observed the interaction patterns of competing and similar platforms and raised a range of requirements. With the requirements, the team could observe technical feasibility and how much each requirement would add value to the product and develop it. It is worth noting that this analysis does not replace moments of validation and research with real users.

Finally, another lesson learned is considering the kind of involvement the representatives have with real users. During this case study, it was crucial to recruit user representatives who had some level of knowledge about end users to capture valuable information about end users. Another aspect that this work emphasized during the discovery and evaluation stages with user representatives was to present usage scenarios in which user representatives imagined themselves taking on the role of real users so that they always had in mind who the product was intended for. Thus, during the evaluation stages, user representatives always brought information about end users, such as "Store managers always have difficulty registering multiple stores" and "Maybe presenting field validation rules can help store managers." Involving people close to end users does not replace the participation of end users in some phase of the design process.

Based on the lessons learned, some reflections arise after this case study. Are there ideal moments for user representatives to collaborate during the design process? Can a product developed addressing user representatives to talk about the needs, pains, or activities of end users of the solution be considered a product that actually addressed the pains and needs of users? What other care in the execution of design techniques and the design process would be possible to overcome the challenges of involving this type of user when there are no end users of the solution available?

This case study presented, in a detailed and in-depth manner, how the systematic use of HCI and UX tools and artifacts allows the design of solutions focused on quality of use. Therefore, the main contribution of this article is the view of the use, advantages, disadvantages of the techniques applied in a real industry case and an alternative scenario of solution research and evaluation, which involved user representatives during the design process. It is worth noting that involving user representatives is not ideal, but when there are limitations, it can be an alternative. The points addressed in this work can inspire students and professionals in the field and contribute to the professionalization of this type of approach.

For future work, with regard to Sales App, there is the opportunity to explore individual registration (not involving importing files), making it sequential and allowing greater flexibility to users during registration, as established as the ideal state of the application during the ideation process. There is also the intention to carry out a new usability test with end users (store managers) instead of user representatives. In addition to this research, carry out a comparative analysis of case studies that use the same tools discussed in this article, to discover differences and moments in which the tools are used.

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