Who am I

I'm a Brazilian, graduated in Industrial Design at FACAMP (Brazil), postgraduate in Furniture Design at SENAC/SP (Brazil), and master in Multimedia at UPorto (Portugal), I have professional experience in many fields of design - from creating material chairs to digital ones!

I have also worked as a teacher of vocational education and as a guest professor in IED-São Paulo, giving classes in the courses of Industrial Design and Interiors Design.

Four years ago, I pivoted my focus towards digital products, transforming former personal interests into areas of professional activity. I have dipped my toes in the field of 3D modeling for digital products - games and Mixed Reality experiences - and dived deep into User Experience design! I have three years of experience working on research and development of higher complexity projects for multinational industries that sought to find new digital transformation solutions.

Project Coruja

THE SITUATION

In the fabrication processes of aircraft, metallic machined parts have to pass through a rigorous inspection process to evaluate its quality, before its assemblage. This process is called Liquid Penetrate Inspection (LPI) and is often done by people who have to manually evaluate possible defects that are less than 0.2 mm in size, part by part.

This project was created to improve this strenuous and stressful activity with the introduction of a novelty device to help the inspector in this process.

MY CONTRIBUTION

UX Strategy

UX Research

Interaction Design

Duration: 6 months

Client: under NDA

Usability Challenges

The usability aspects of the project were divided in 2 areas: the physical aspects of the device – its shape, size, weight and the best posture to use it, among other factors – were conducted by an ergonomics team.

My team and I worked on the second area: the device's software interface. Our goal was to create an interface that would guide the user through the inspection process in a way that made sense for the user. This was a challenge as they had never had contact with a tech-heavy device like this before.

To fulfill the inspection demands, the device had to have many advanced functions that increased the task complexity. Therefore, it was crucial for us to design an interface that was easy to navigate and use, while still providing all the necessary information and functions for a successful inspection.

We also had to take into account the current structure in terms of how organization happened in the factory, the names and common terminology used, the steps involved in the inspection process, and how to incorporate the use of this device without interfering with the inspectors' work — or at the very least, with the least amount of friction.

Design Process

CRITICAL KNOWLEDGE ACQUISITION

Literature Review

Research

Initial user interviews

ITERATION 1

Ideation

User-flow diagram

Wireframing

Low fidelity prototyping

First round of test (in house + user sample)

Fixes

ITERATION 2

Medium fidelity prototyping

Second round of test (in house + user sample)

Fixes

ITERATION 3

High fidelity prototyping

Final Evaluation of the solution

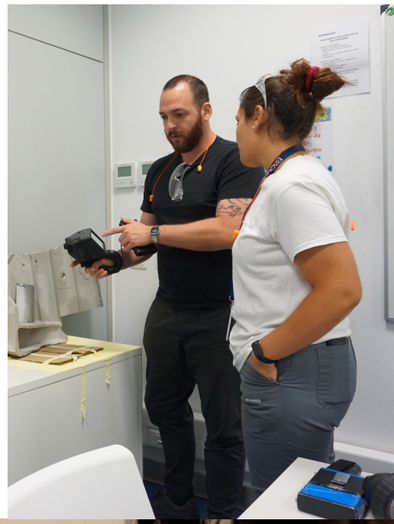
Usability Evaluation

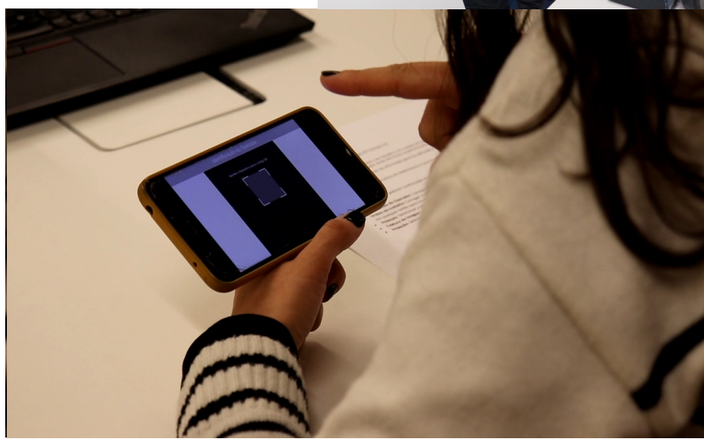
A total sample of fifteen participants took part in the usability tests -7 females and 8 males, aged between 20 and 61 years.

Initial Ethnographic + Technological literacy survey

PROTOTYPES TESTING

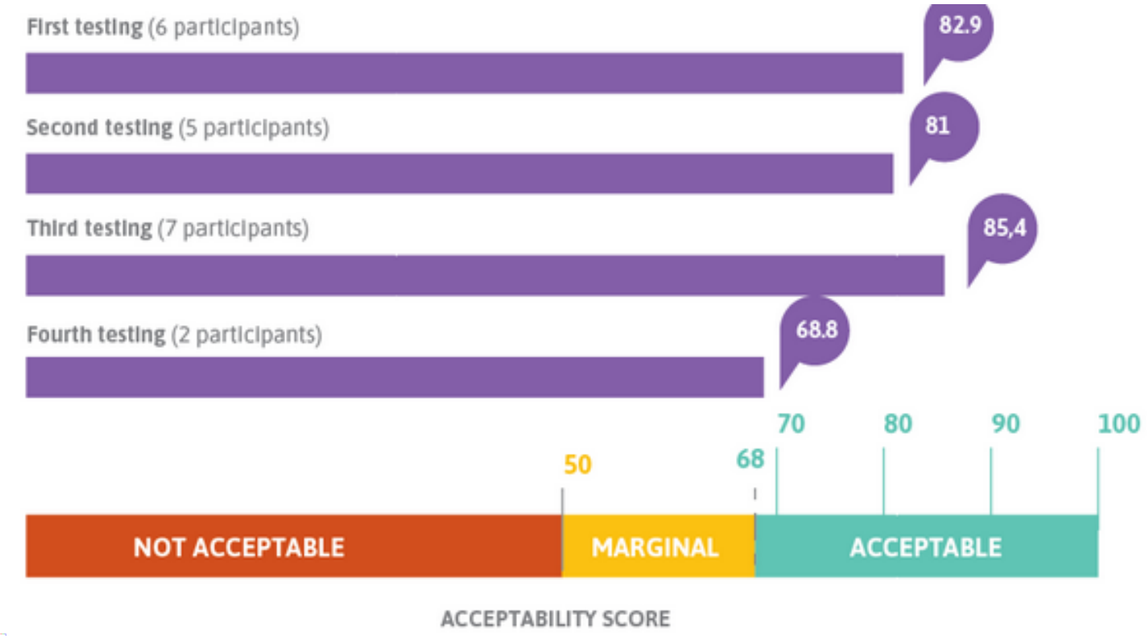
- Prototypes created and showcased with Figma
- A mobile phone as used as a mock-up to the device's display
- Users used the prototypes to perform the tasks/scenarios we prepared
- The “think out loud” method was applied while operating the prototype
- Moderators watched the users and took notes. They were also filmed for later analysis
- At the end of the session - users filled out a modified System Usability Scale (SUS) questionnaire
- Results were analyzed, a list of fixes/changes was prepared
- We repeated the testing in each iteration





The most recent test had a lower SUS than the others due to the fact that there were a low number of participants available at the time. During this last evaluation, we felt that these individuals evaluated the physical aspects of the device – which they never had used before – together with the GUI. Returning to the factory sometime after they adopted the device to do a more thorough examination would be the optimum course of action.

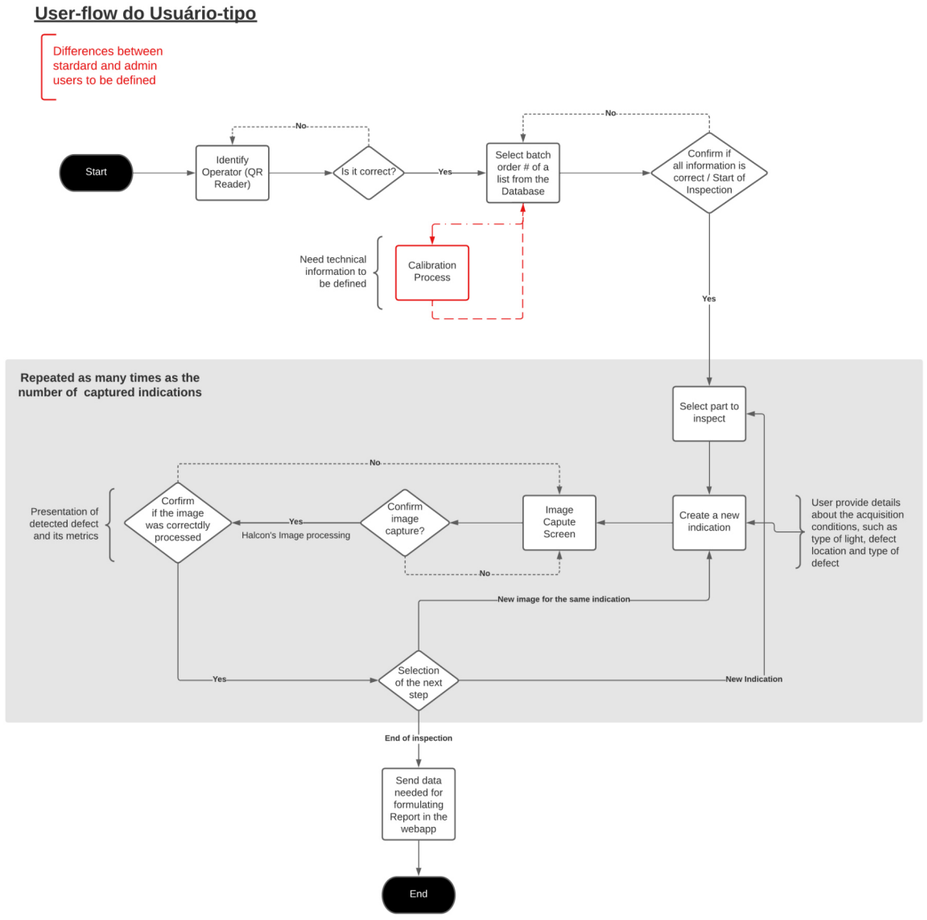
A paper detailing more information regarding the project's results was approved to be published in the 2023 International Symposium on Occupational Safety and Hygiene. The publication will come out in July 2023.



Information Architecture

Usability was one of our top concerns. Utilizing the app added fresh processes and new resources to the user's task, including a 4K camera and computer vision metrics. The flow through the app had to be designed to create an experience of use with the least amount of friction possible. Therefore, we designed a linear structure composed by concatenated steps. Each step build on the last, mimicking the behavior of the inspectors in the production line.

A use sequence that was familiar – or at least asked the users to perform familiar tasks – lowered their cognitive load and granted a foolproof process.

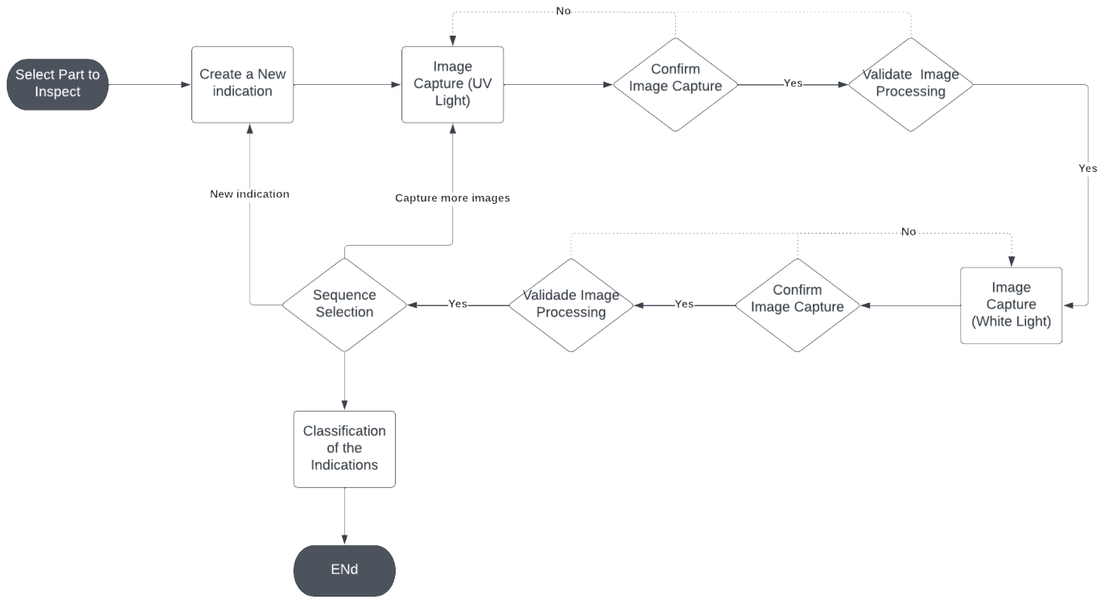


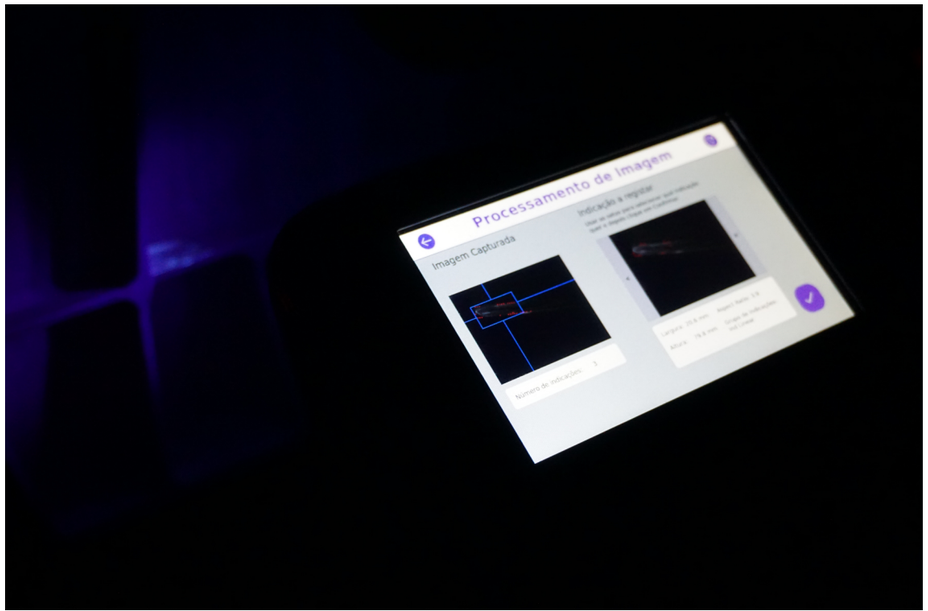
One UX Challenge and How It Was Solved

In order for our system to work, the device had to assess potential defects – called internally as indications – to determine whether they were false positives or flaws and, if the latter, whatever type of defect they would fall under. This evaluation was done by taking a picture of the indication and by processing the image with complex computer vision algorithms. Each indication had to be evaluated in 2 sets of light: UV and white light in that order or else the inspections was not valid.

Our team created a number of menus and screens to help the user navigate this intricate feature. These menus needed to be explicit in stating that at least two images, one in each light situation, had to be taken of each indication.

Additionally, they had to instruct the user on the correct order, and the proper technique for taking the pictures, then enable the user to compare the images, so they had the last say in the classification of the indication.

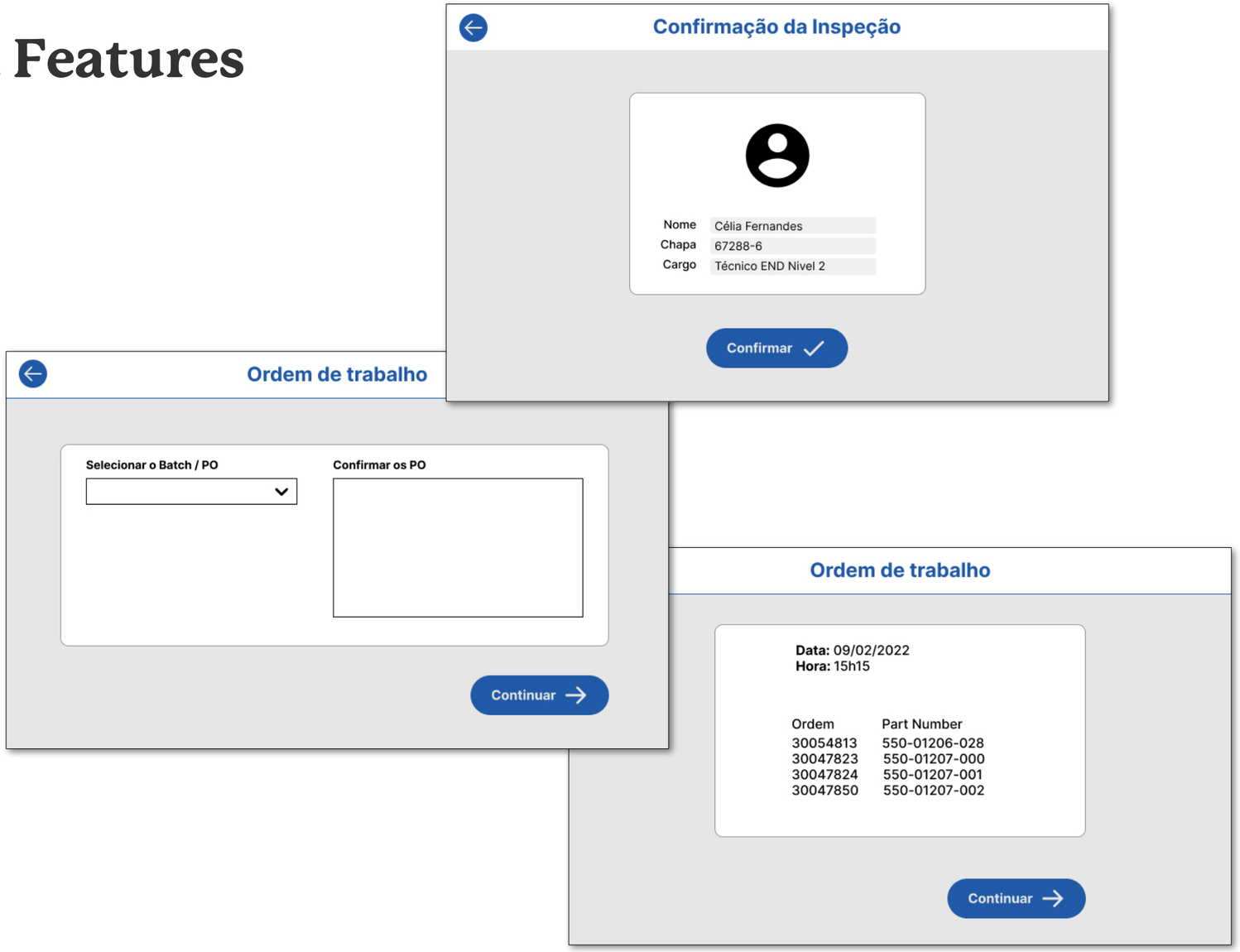




App Screens and Features

GUIDED STEP-BY-STEP INSPECTION START

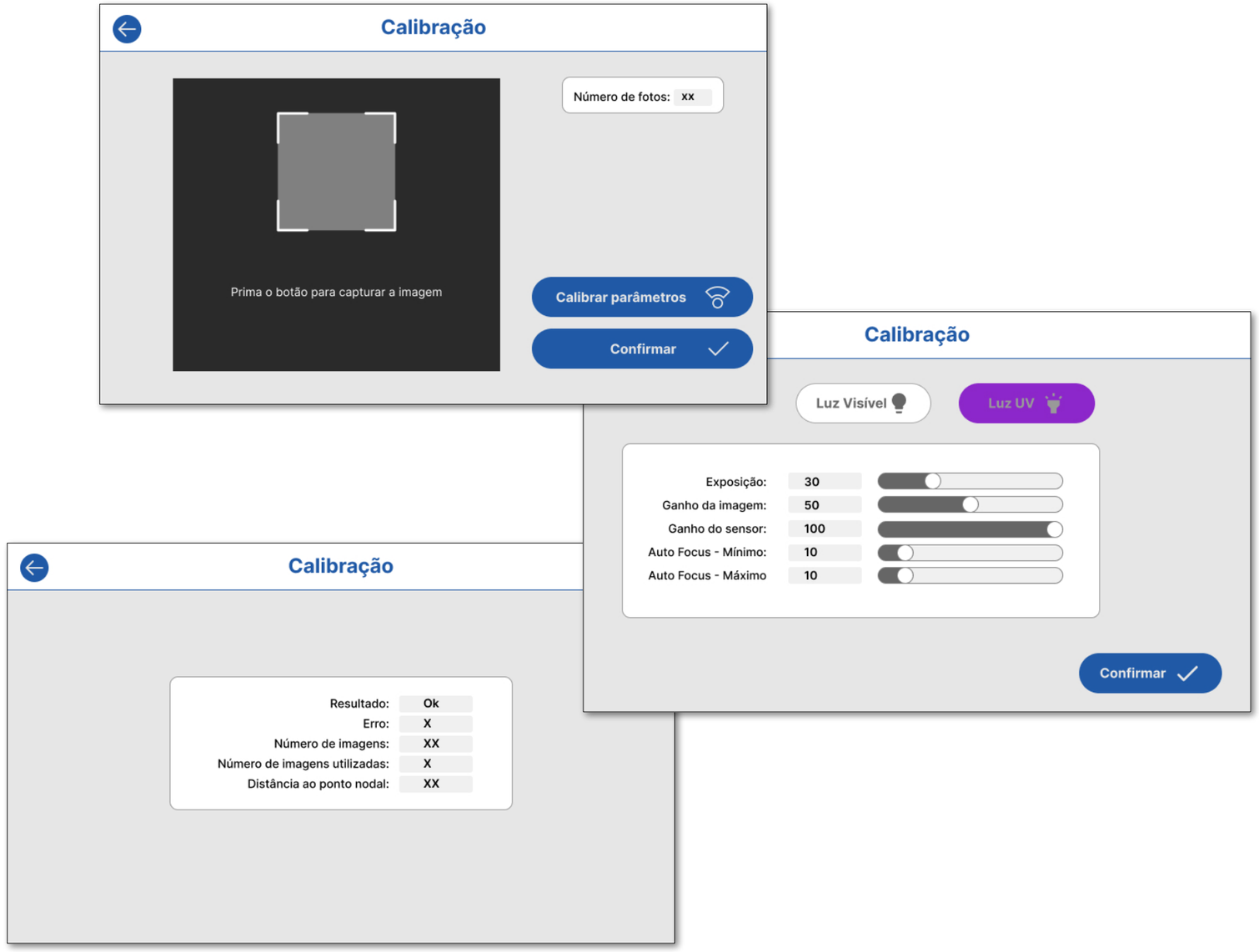
Simple and clean layout



DEVICE CALIBRATION

Straightforward process (complex procedure done only by specialists)

Easy to understand parameters

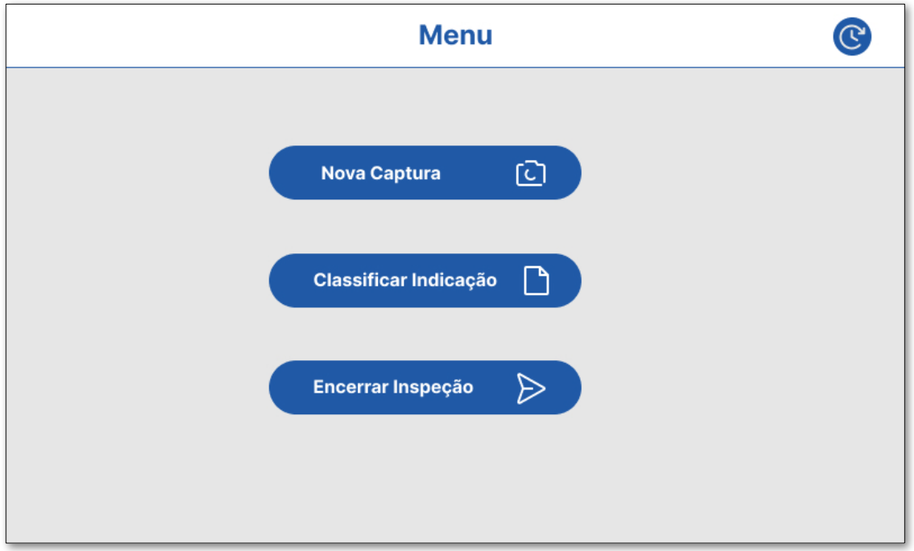


BUTTONS

Designed to be pressed by gloved hands.

Positioning favored the use of one hand only (user need to carry a flashlight in the other hand in certain moments of the inspection).

Use of icons with label for faster function recognition.



Lära - Workers Module

THE SITUATION

This furniture company's factory floor workers had a multitude of procedures to perform as they rotated through different workstations. Mastery of these procedures was crucial for the job, and training was conducted on the job by senior workers. These trainers relied only on a spreadsheet as their teaching resource, aside from their work experience.

To address the trainers' and workers' needs for improved training, we developed a comprehensive solution. This project encompassed a set of digital tools, including a platform that connected the Trainer Module (for teaching) to the Workers Module (for learning), ensuring a better training experience for both.

MY CONTRIBUTION

UX Strategy

UX Research

Interaction Design

UI Design

Duration: 18 months (from 2022 to 2024)

Client: under NDA

Usability Challenges

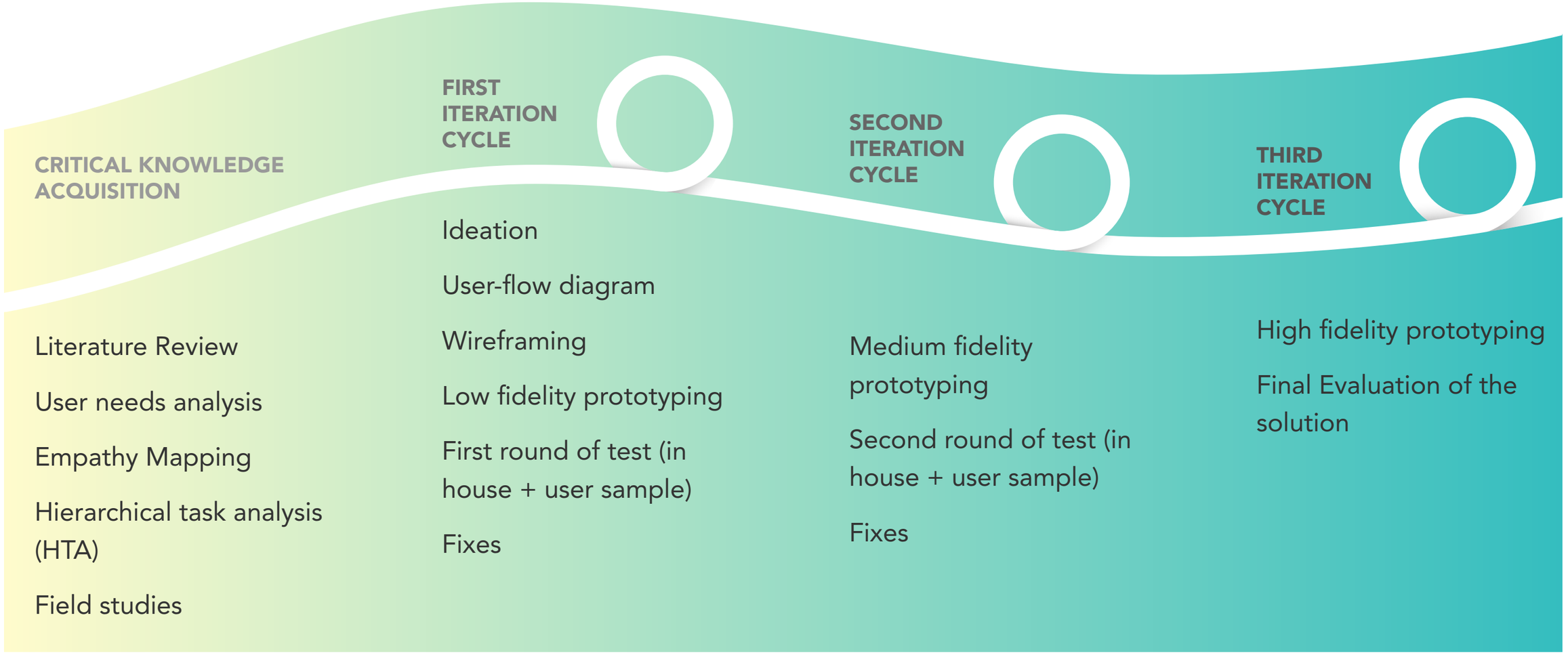
The project development was divided by its modules. The Workers Module's main goal of was displaying the training material following the factory standards and regulations while being easy to use and engaging.

Apart from the need of introducing a new digital tool in the workflow of those workers – which is a usability challenge in itself – the training would have to happen in an Augmented Reality (AR) environment. The use of AR technology made it more difficult for the team as, firstly, there was not much reference to draw from. Being AR a novelty, we had to resort only to academic references, but the ones we had access to had more to do with the technology of the solution and less on usability.

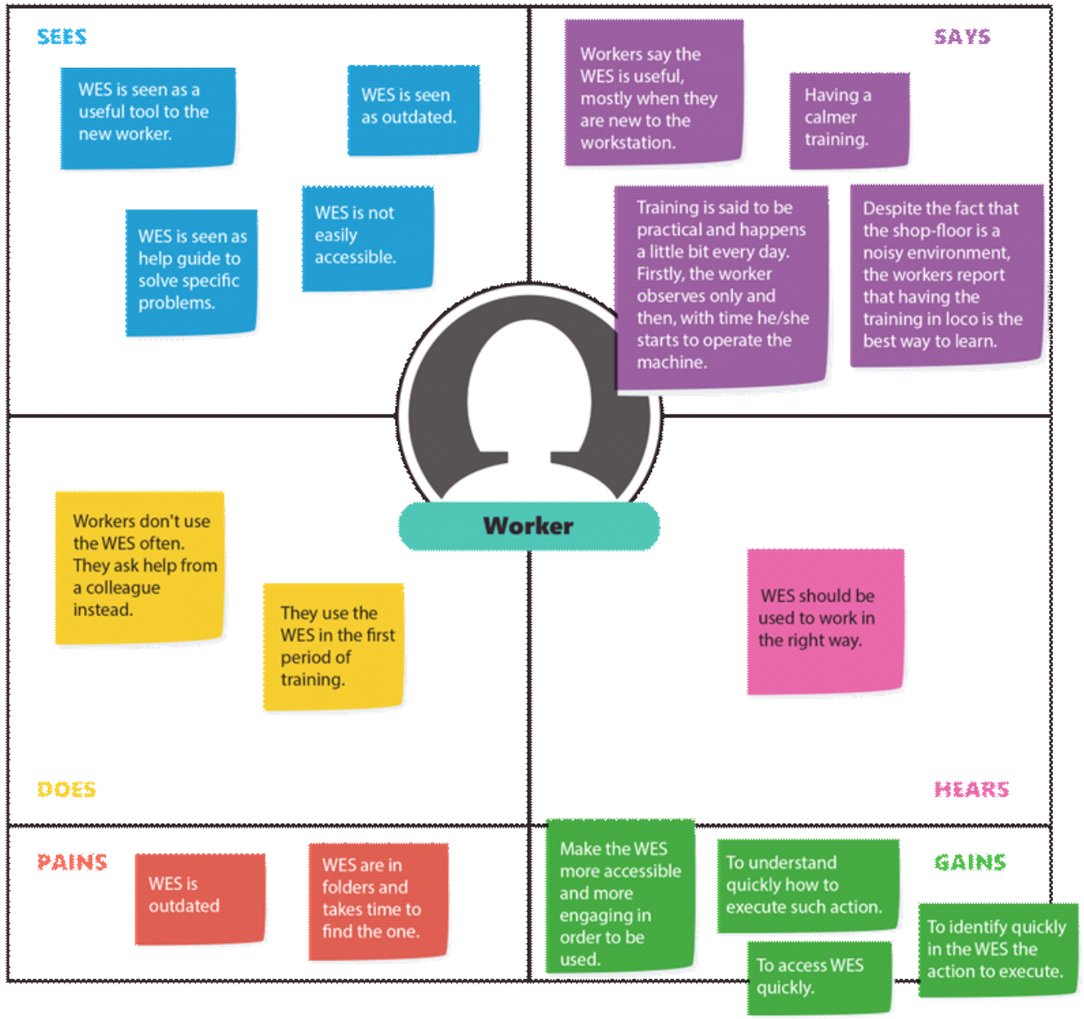
Secondly, AR added a new layer of possibilities, as the user now could extrapolate the boundaries of the phone screen. This is a matter that had to be taken into consideration in order to determine whether this extrapolation improved the user experience, or if it worked against it.

The company already had a design system that covered app creation and development but lacked support for augmented reality (AR). Given the novelty of AR, the design team had not addressed it. Adapting the design system to incorporate AR posed a challenge as we aimed to respect the existing definitions while ensuring compatibility with our use case.

Design Process



Due to the project's high level of complexity, we chose to use a process that involved numerous iterations, each of which focused on a different aspect of the complete program. In this way, we were able to generate many ideas and solutions, classifying those that would or would not fit into the project before presenting a more consolidated version to the client and other stakeholders.

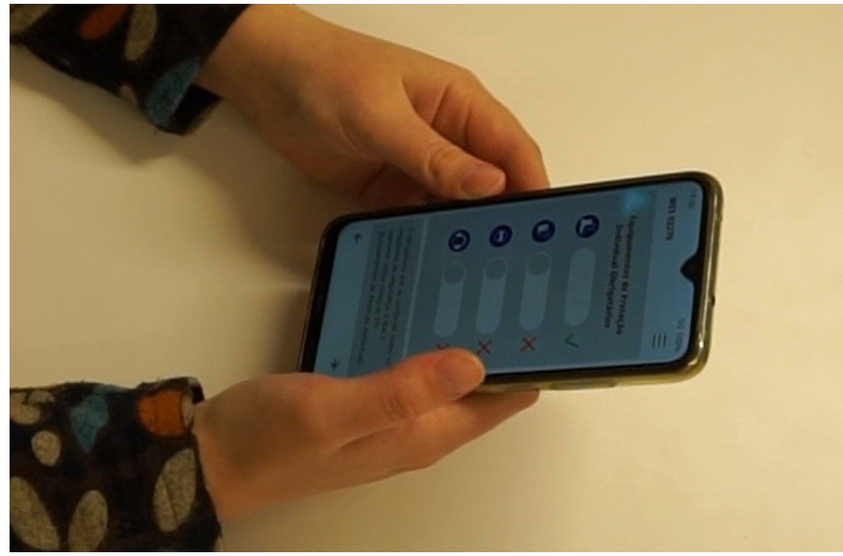


WORKER EMPATHY MAP

Usability Evaluation

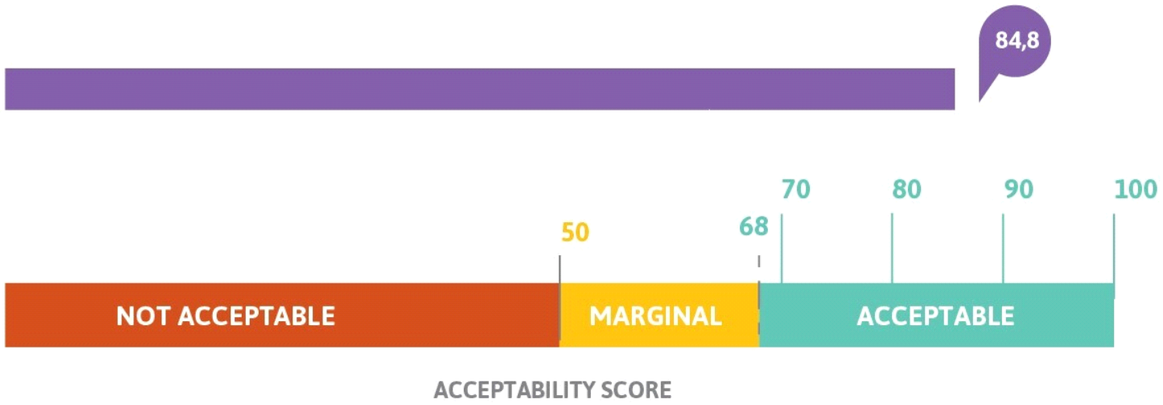
PROTOTYPES TESTING

- Prototypes created and showcased with Figma
- A mobile phone as used as a mock-up to the device's display
- Users used the prototypes to perform the tasks/scenarios we prepared
- The “think out loud” method was applied while operating the prototype
- Moderators watched the users and took notes. They were also filmed for later analysis
- At the end of the session - users filled out a modified System Usability Scale (SUS) questionnaire
- Results were analyzed, a list of fixes/changes was prepared
- We repeated the testing in each iteration
- Every new consolidated version would be presented and validate with a stakeholder’s meeting



Inital testing show positive results with a positive rating in the SUS avaliation.

This is an ongoing project. I've been part of it until right before evaluation on the second iteration cycle, so information available is incomplete.



SIMPLE AND INTUITIVE.

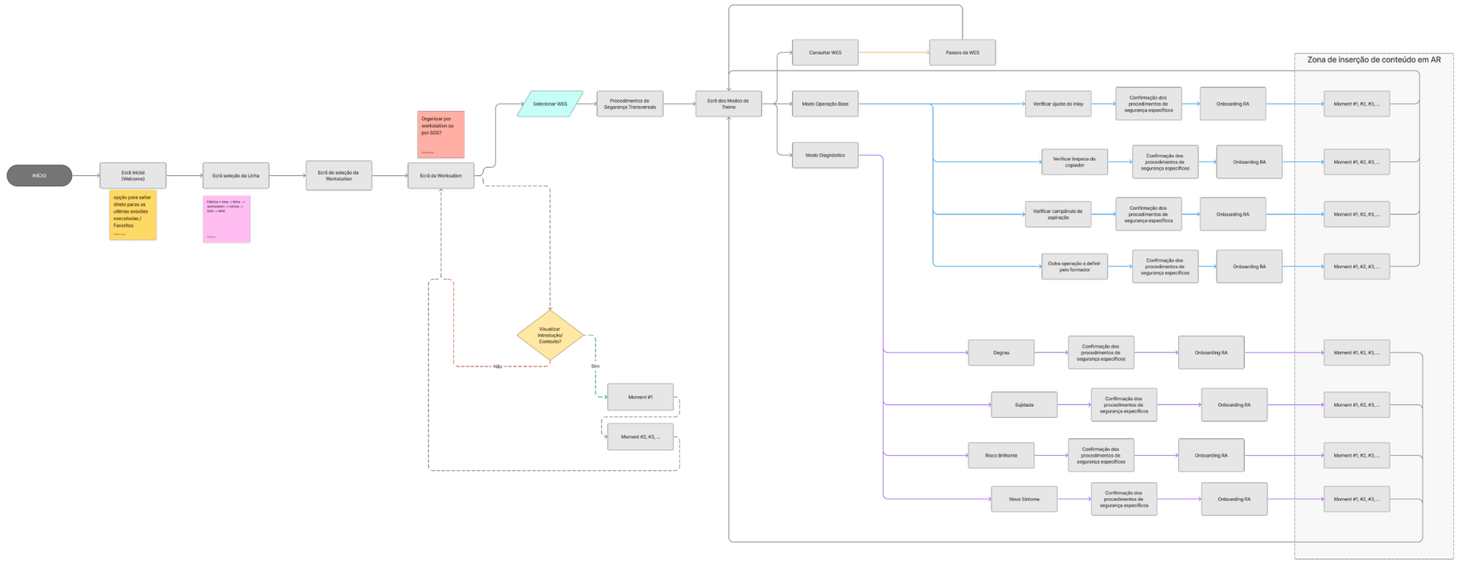
SIMPLE, FAST AND WITH WISDOM TO HELP THE WORKER.

VERY CLEAN LAYOUT LEAVING NO ROOM FOR DISTRACTIONS.

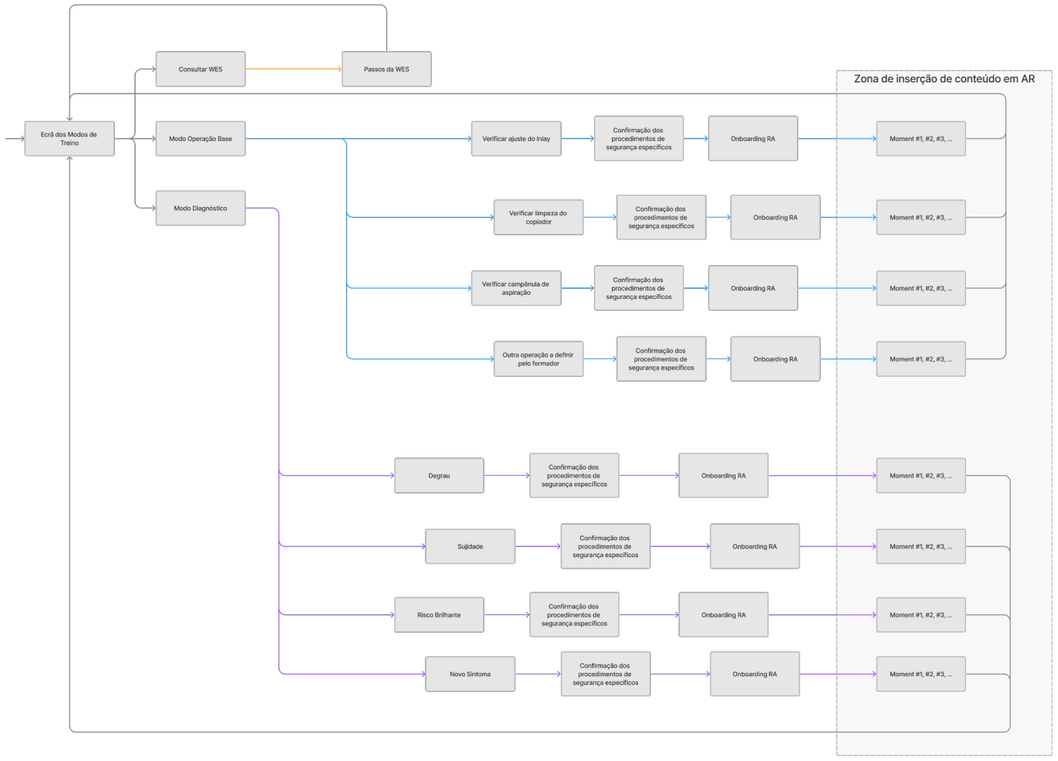
Information Architecture

The use of the Worker module could be divided in two sections: selection of the training section and the training session itself. This way, the first section could function as a normal mobile app, leaving the AR content only where it mattered more: the training sessions.

There was a very solid hierarchy that we had to follow to list the training sessions. This hierarchy came from the way the factory was organized and was something we had to incorporate in our solution.



After the critical knowledge acquisition stage, we identified three different types of training sessions that could be offered to the workers. The first would be a Basic Operations mode, in which the training sessions address the basic processes of operating the equipment and the manufacturing process. The second was the Diagnosis mode, in which the training session would be triggered by a common problem that often happen in the workstation. The third was the Consultation mode, which enable the worker to consult the written description of the workstation operation in a more direct manner.

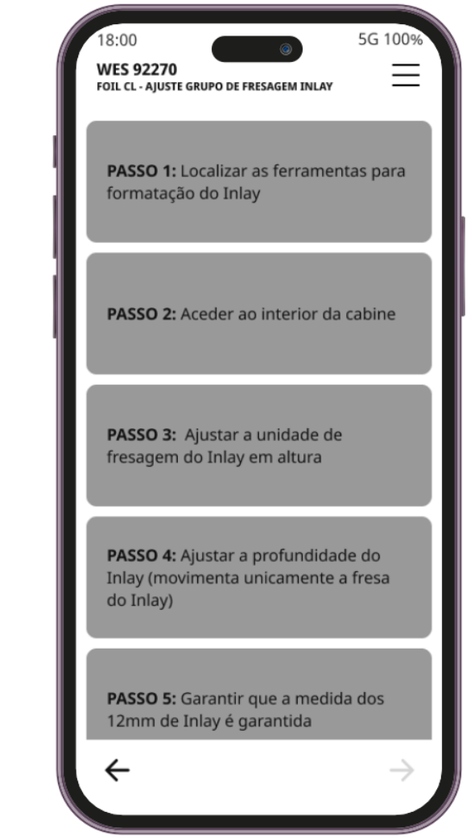


One UX Challenge and How It Was Solved

All the written material the client had concerning their day-to-day operations came in Work Element Sheets (WES), spreadsheets that listed the step-by-step of how the worker should do his tasks. The Consultation mode had to be the most direct transcription of this content, in a form that made it easy to be used, as our intention was for them to use this tool al the time.

THE WES TAPPED TO THE SIDE OF A MACHINE IO THE FACTORY LINE

The solution started out looking a lot like a spreadsheet – a direct translation of these WES. After many attempts, our final design presented a simple solution that made it easy to navigate in every step and displaying only what mattered most, decreasing cognitive overload if compared with the paper spreadsheet printout the users were used to.



App Screens and Features

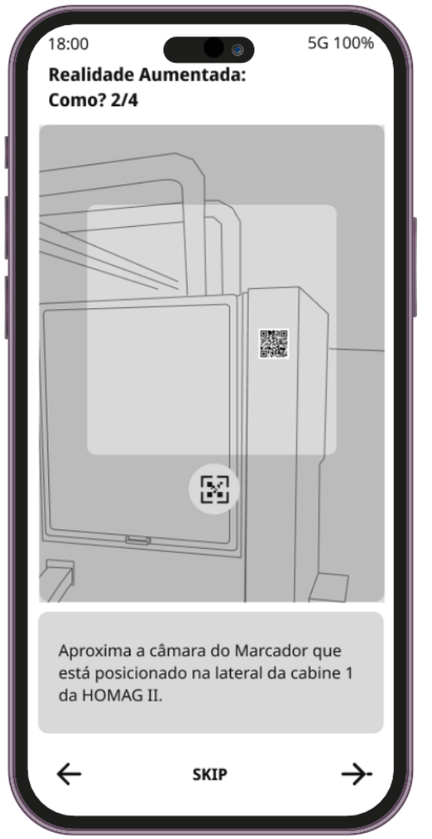
MODULAR DESIGN

The design revolved around the text box module. The text box was dimensioned to fit text coming from the WES spreadsheet in a manner in which the text from each cell could be divided in smaller chunks that retained textual sense. Once specified, this element would be used in every occurrence in the application.

Based on its graphical aspects, the modularity of the entire application was created.

ONBOARDING

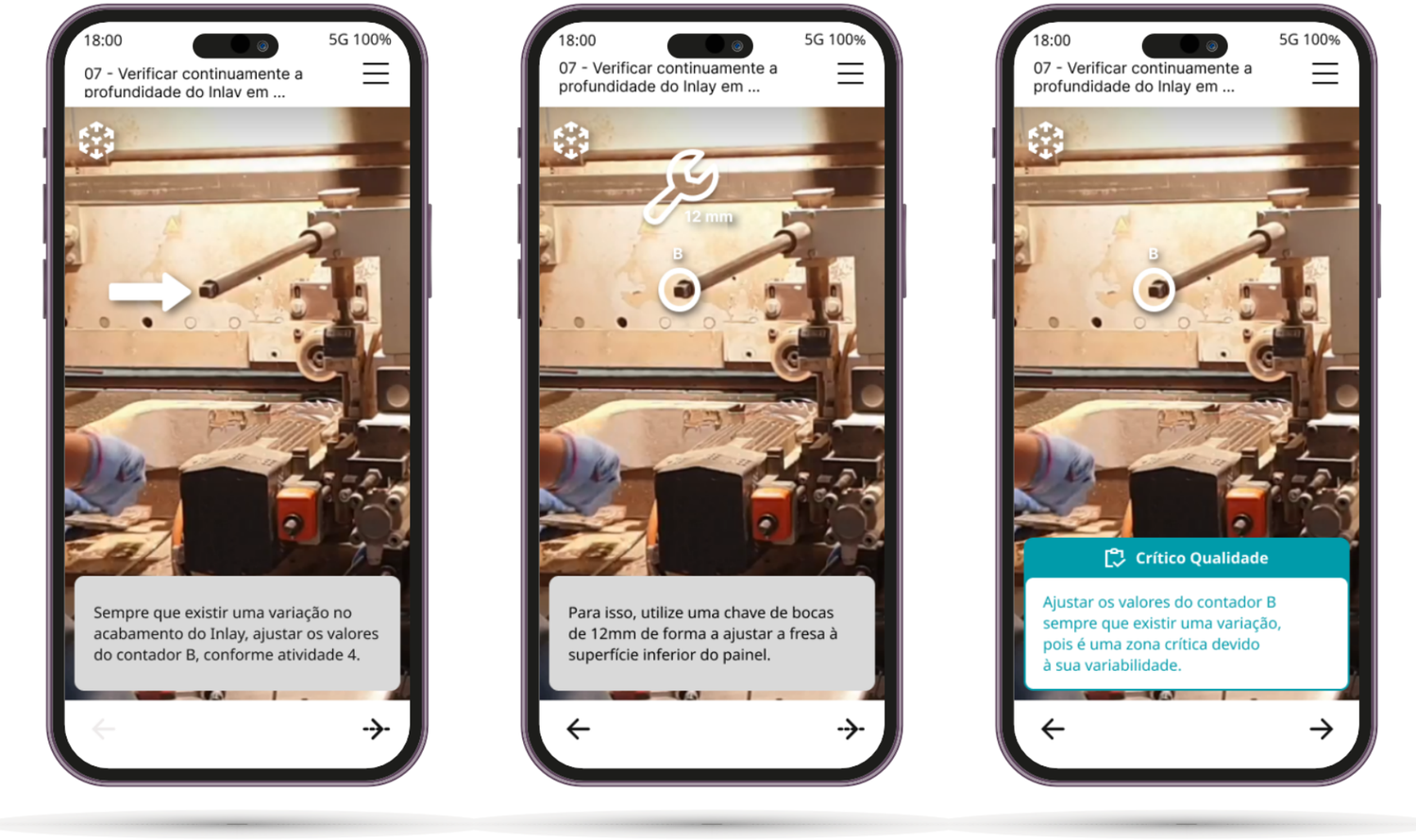
Increase users’ awareness of new, unfamiliar AR technology.



TRAINING SESSIONS

Use of augmented reality in a guided manner.

Use of simple iconography and direct instruction to decrease cognitive overload.



Lära - Trainers Module

THE SITUATION

The is the continuation of the last project that I choose to divide to make it easier to comprehend. Previously, I presented the module focused on the worker's learning side of the platform. Now I am going to present the Trainer Module – responsible for creating the training sessions for the workers.

MY CONTRIBUTION

UX Strategy

UX Research

Interaction Design

~~UI Design~~ (got out before it started)

Duration: 18 months (from 2022 to 2024)

Client: under NDA

Usability Challenges

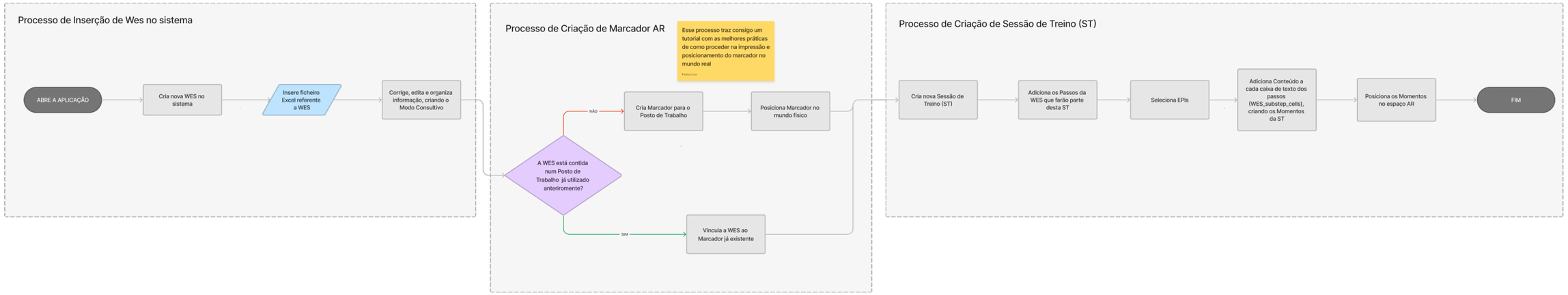
The main goal of this module was to be a training session creating tool made for non-specialists in training. The trainers were seassoned professionals who had experience in doing their work. They trained new colleagues in a "loose" master and apprentice dynamic: when the fresh hired worker had any doubt, they would ask their trainer, who would point to how to perform such a task or the best way to solve their problem. A group of new employees' learning curves were unequal due to a lack of formalization, improper learning pathways, and lack of control over the process.

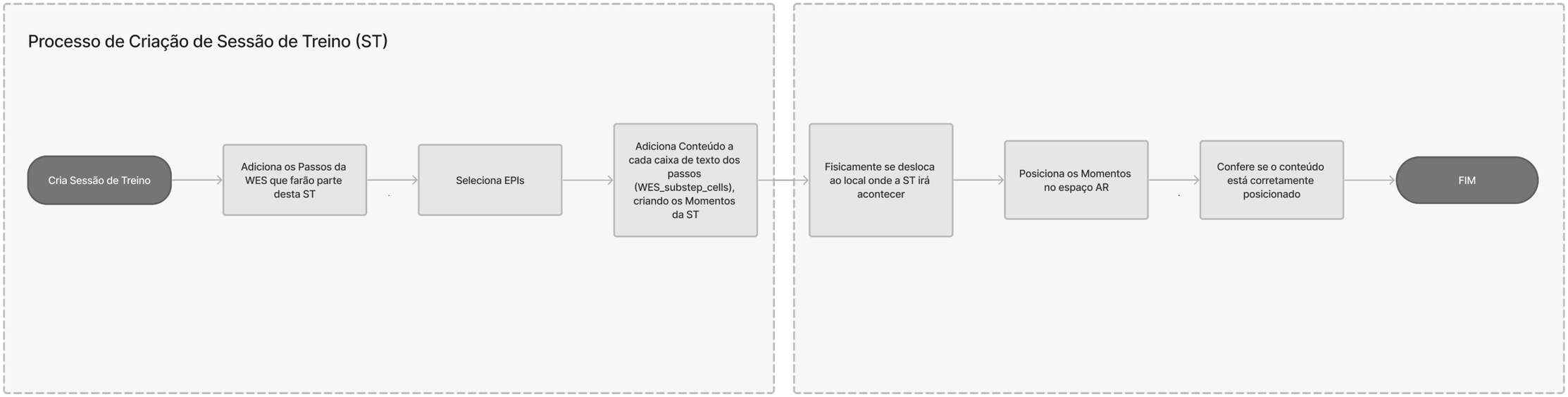
The project had to be, also, an augmented reality creation tool for non-specialists in AR. As training sessions would be displayed in AR, they had to be somehow positioned in the real world space beforehand. Our solution had to create a subsystem to cover this feature in a way that made sense for our users.

Information Architecture

There are three main parts to using this module. Inserting WES in the system; creation of AR markers; and the process of creating the training sessions. The first two were more bureaucratic processes that concerned adhering to the factory's existing information structure and the anchoring process of AR content in the real word, respectively.

Eu, como formador, quero criar uma Sessão de Treino para uma WES que ainda não foi inserida no sistema :

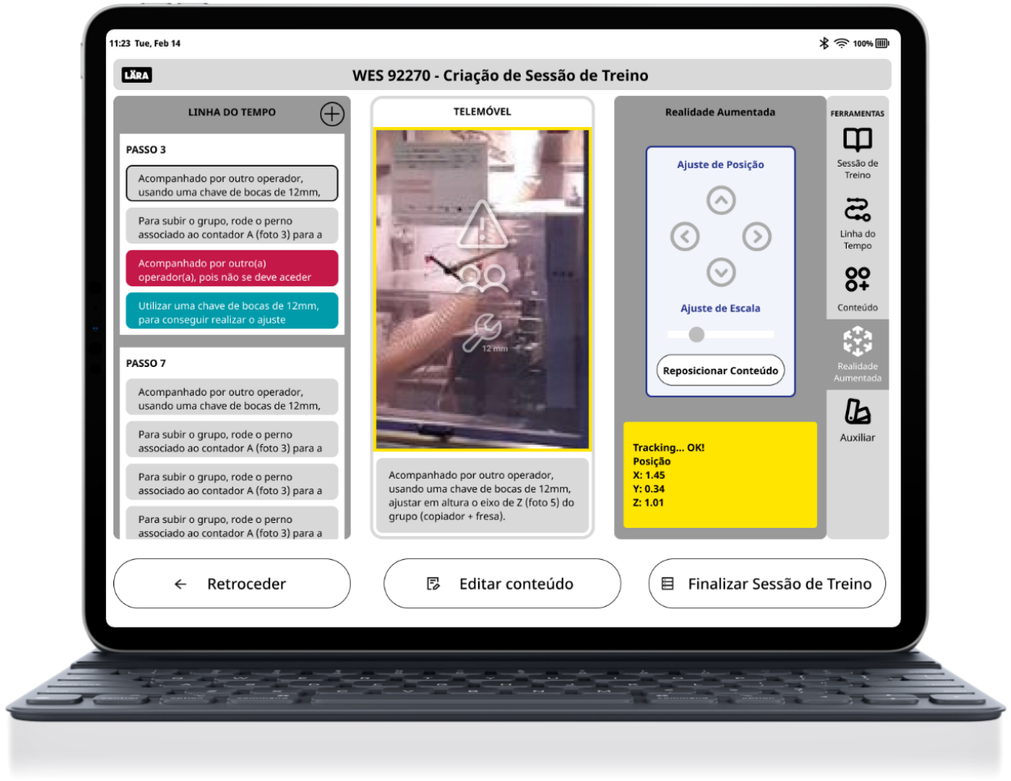


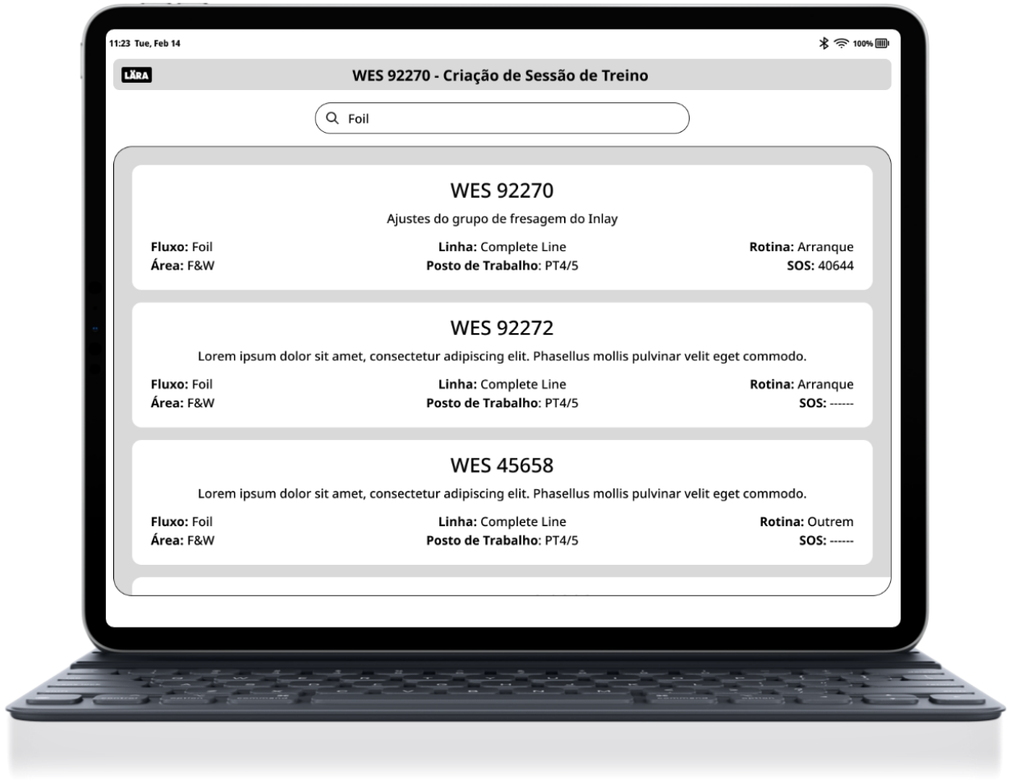


Creating training sessions can be further divided in two sections: Content creation and AR positioning of the content. This segmentation was designed to lower the cognitive demand, ensuring the user to focus his attention in one task at a time.

App Screens and Features

Given that the Trainers Module was developed later in the project, this is not the final solution. I'll leave a few of the low-fidelity prototype screens I was working on when I left the project.


11:23 Tue, Feb 14
100%
WES 92270 - Criação de Sessão de Treino
LINHA DO TEMPO
PASSO 3
Acompanhado por outro operador, usando uma chave de bocas de 12mm,
Para subir o grupo, rode o perno associado ao contador A (foto 3) para a
Acompanhado por outro(a) operador(a), pois não se deve aceder
Utilizar uma chave de bocas de 12mm, para conseguir realizar o ajuste
PASSO 7
Acompanhado por outro operador, usando uma chave de bocas de 12mm,
Para subir o grupo, rode o perno associado ao contador A (foto 3) para a
Para subir o grupo, rode o perno associado ao contador A (foto 3) para a
Para subir o grupo, rode o perno associado ao contador A (foto 3) para a
TELEMÓVEL
12 mm
Acompanhado por outro operador, usando uma chave de bocas de 12mm, ajustar em altura o eixo de Z (foto 5) do grupo (copiador + fresa).
Realidade Aumentada
Ajuste de Posição
Ajuste de Escala
Reposicionar Conteúdo
Tracking... OK!
Posição
X: 1.45
Y: 0.34
Z: 1.01
FERRAMENTAS
Sessão de Treino
Linha do Tempo
Conteúdo
Realidade Aumentada
Auxiliar
Retroceder
Editar conteúdo
Finalizar Sessão de Treino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WES 92270 - Criação de Sessão de Treino
Foil
WES 92270
Ajustes do grupo de fresagem do Inlay
Fluxo: Foil
Área: F&W
Linha: Complete Line
Posto de Trabalho: PT4/5
Rotina: Arranque
SOS: 40644
WES 92272
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Phasellus mollis pulvinar velit eget commodo.
Fluxo: Foil
Área: F&W
Linha: Complete Line
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Rotina: Arranque
SOS: ------
WES 45658
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Phasellus mollis pulvinar velit eget commodo.
Fluxo: Foil
Área: F&W
Linha: Complete Line
Posto de Trabalho: PT4/5
Rotina: Outrem
SOS: ------

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Quentions? Let's have a chat!