Degree in Informatics Engineering

Project IV Curricular Unit

Equipment Request Application

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Supervised

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1. Introduction and objectives

This work was developed by the authors João Marques and José Lima, we are students of the Computer Engineering course at the Polytechnic Institute of Viana do Castelo (IPVC), as part of the Project Proposal IV discipline, in the academic year 2022/2023. The project was carried out in collaboration with the entity "Colab4Food", an organization active in the engenharia food .

The theme chosen by the authors was the "Application for equipment registration", with the aim of designing an efficient solution for the management and control of the equipment used by the

company. The project had as main guidelines the survey of requirements and the development of an application that allows the registration and administration of equipment in an organized and accessible way.

The application proposed by the authors allows users to enter detailed information about each equipment, such as description, brand, purchase price and location, offering a comprehensive view of all assets of the organization. In addition, the system has different levels of access, designating specific profiles for viewing, editing and administering the data, thus ensuring the security and integrity of the information. In the development of the project, several technologies and tools were explored, both Open Source and Microsoft, such as PowerApps and PowerAutomate. This approach allowed the creation of a robust and intuitive application, with advanced functionalities to meet the specific needs of "Colab4Food".

This paper details the entire application development process, from the initial conception to the final implementation, addressing the design decisions, the system architecture, the integration of the selected technologies, as well as the validation and security strategies implemented to ensure the proper functioning and reliability of the application.

The work demonstrates the mastery of the Computer Engineering skills acquired by us throughout the course, in addition to offering a practical and innovative solution for the management of "Colab4Food" equipment. The expectation is that the developed application can contribute significantly to the optimization of the company's internal processes, improving the allocation and tracking of equipment and, consequently, increasing the operational efficiency and the overall performance of its activities.

2. Technologies, tools, libraries, methodology and project management

2.1 Programming Environment

We used the Microsoft Power Platform programming environment. This strategic choice provided an agile and efficient approach to creating the "Colab4Food" equipment registration application.

Microsoft Power Platform is a suite of tools that includes PowerApps, Power Automate (formerly known as Microsoft Flow) and Power BI. These technologies, combined, allow you to create customized business solutions, automate processes and analyse data in an integrated way and with low need for manual coding.

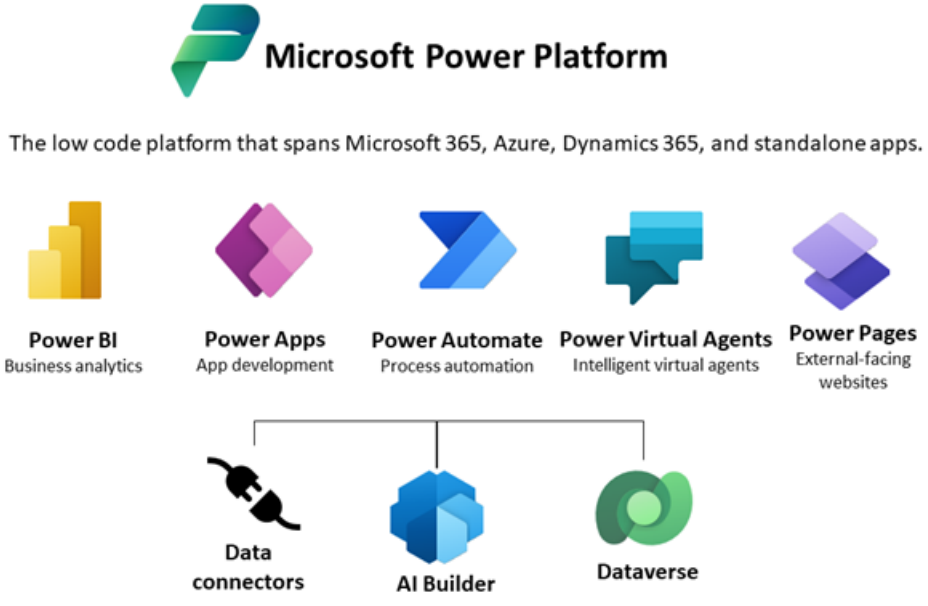


Figure 1 - Illustration of the Microsoft Power Platform

2.2 Methodology and Project Management

During the development of this project, structured methodologies and efficient management were adopted to ensure the proper progress and success of the "Colab4Food" equipment registration application.

The methodology followed was based on an agile development model, with a focus on flexibility and continuous collaboration between team members and mentors. For this, weekly meetings were held with the supervisors, where the authors presented the progress of the work, clarified doubts and received valuable feedback.

These weekly meetings allowed a close monitoring of the project, ensuring that the decisions taken were aligned with the objectives set out in the initial proposal. In addition, they enabled the early identification of possible challenges and obstacles, allowing for adjustments and course corrections throughout the development process.

The project was managed collaboratively, with well-defined tasks and responsibilities. The division of labour allowed an efficient use of the individual knowledge and skills of each team member, maximizing productivity and the achievement of objectives.

2.3 Used Technologies

2.3.1 Microsoft Powerapps

Power Apps is a Microsoft platform that allows you to create custom apps without extensive programming. With an intuitive visual interface, users can develop mobile and web applications, connecting them to various data sources. It is an agile and versatile solution to solve business challenges efficiently.

2.3.2 Dataverse

Dataverse is a Microsoft database, integrated with the Power Platform platform, that allows you to store and manage structured data to create customized applications and automations in a secure and scalable way.

3. Use Cases, Users Analysis, Class Diagram

3.1 Use Case Diagram

We have four tiers of users, that would be the normal user, helper, responsible and admin.

The responsible is able to create new equipments, and also managins his requests and maintences.

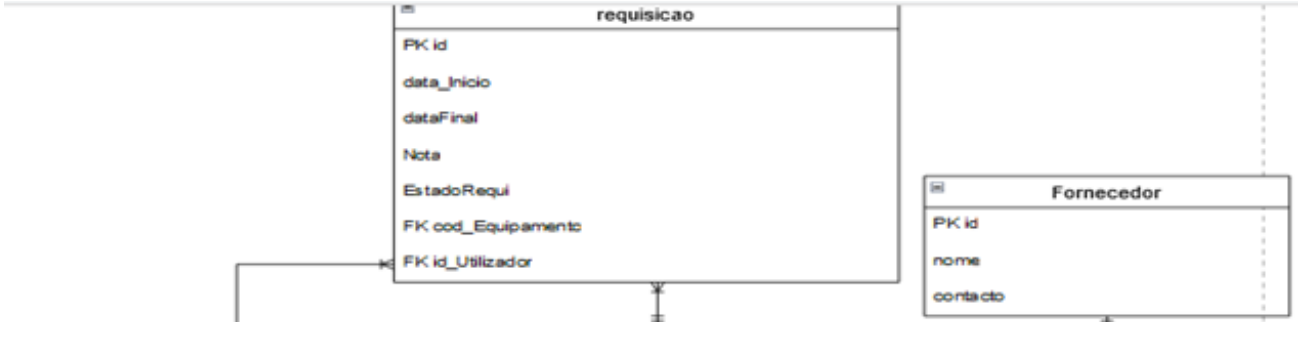
All the four tiers of users would be able to request equipments.

The helper is also able to help responsible, reviewing the equipment that the responsible add, making sure is everyithing allright with the equipment infos, and also being able to help managing equipment maintences.

Admin is able to manage both users and providers.

Figure 4 - Illustration of the use case diagram.

3.2. Class Diagram



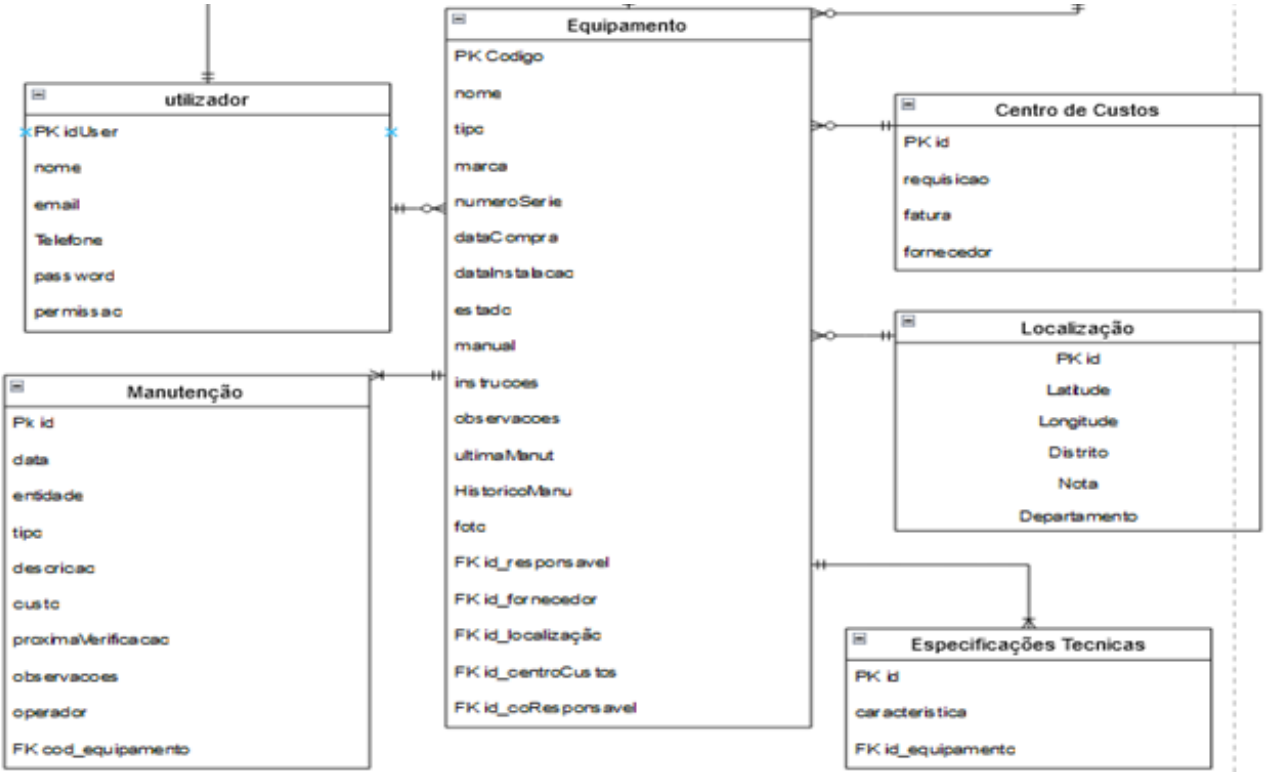
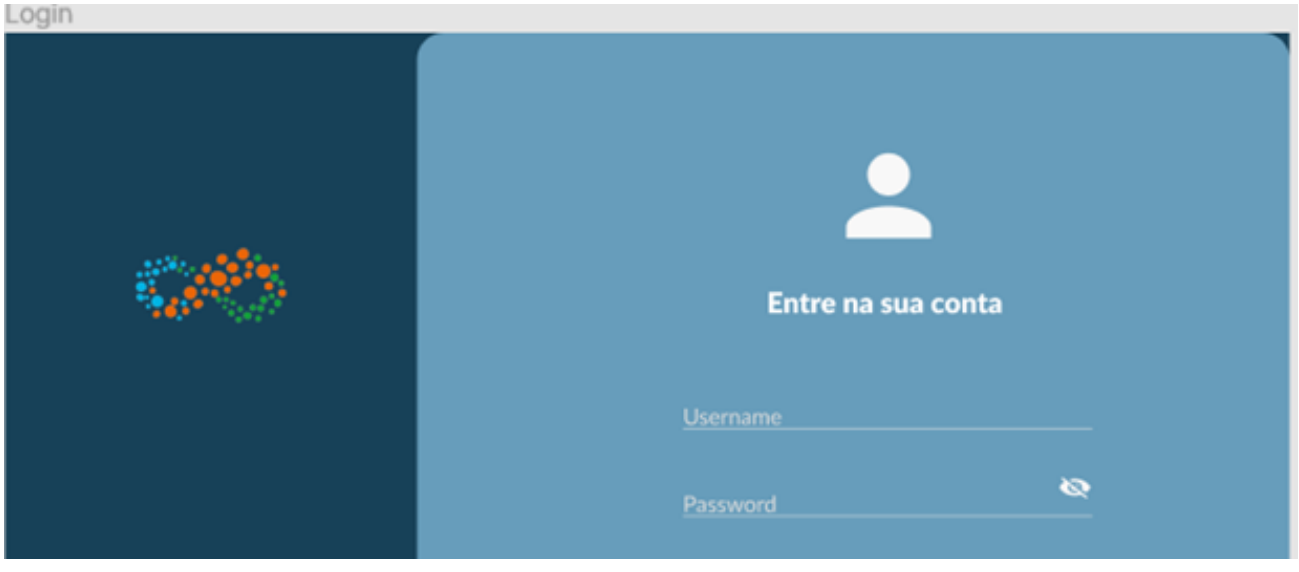


Figure 5 - Illustration of the class diagram.

4. Mockups

Login



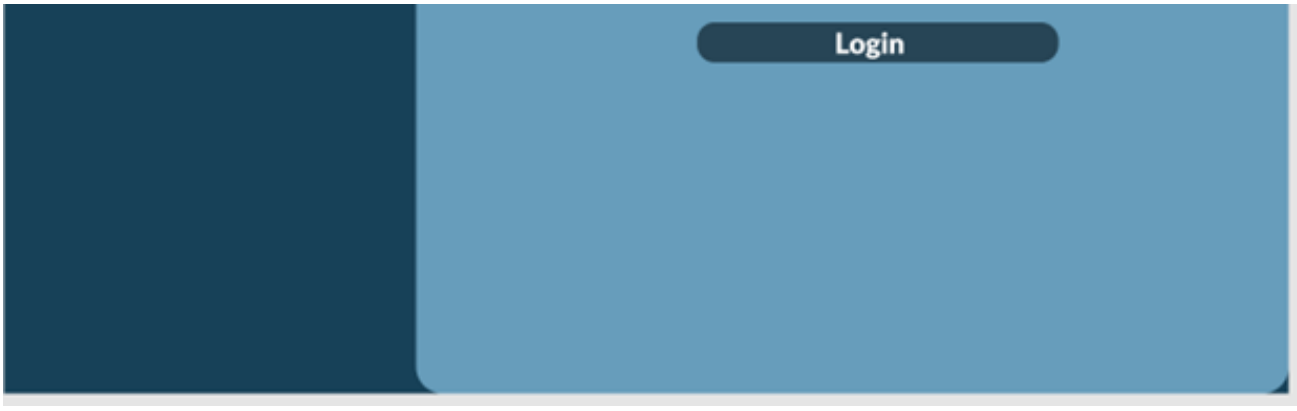
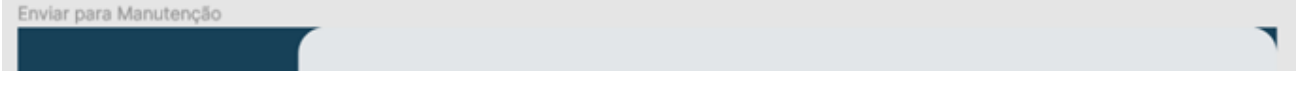


Figure 6 - Illustration of the Login mockup.

DashBoard

Figure 7 - Illustration of the dashboard.

Manutention



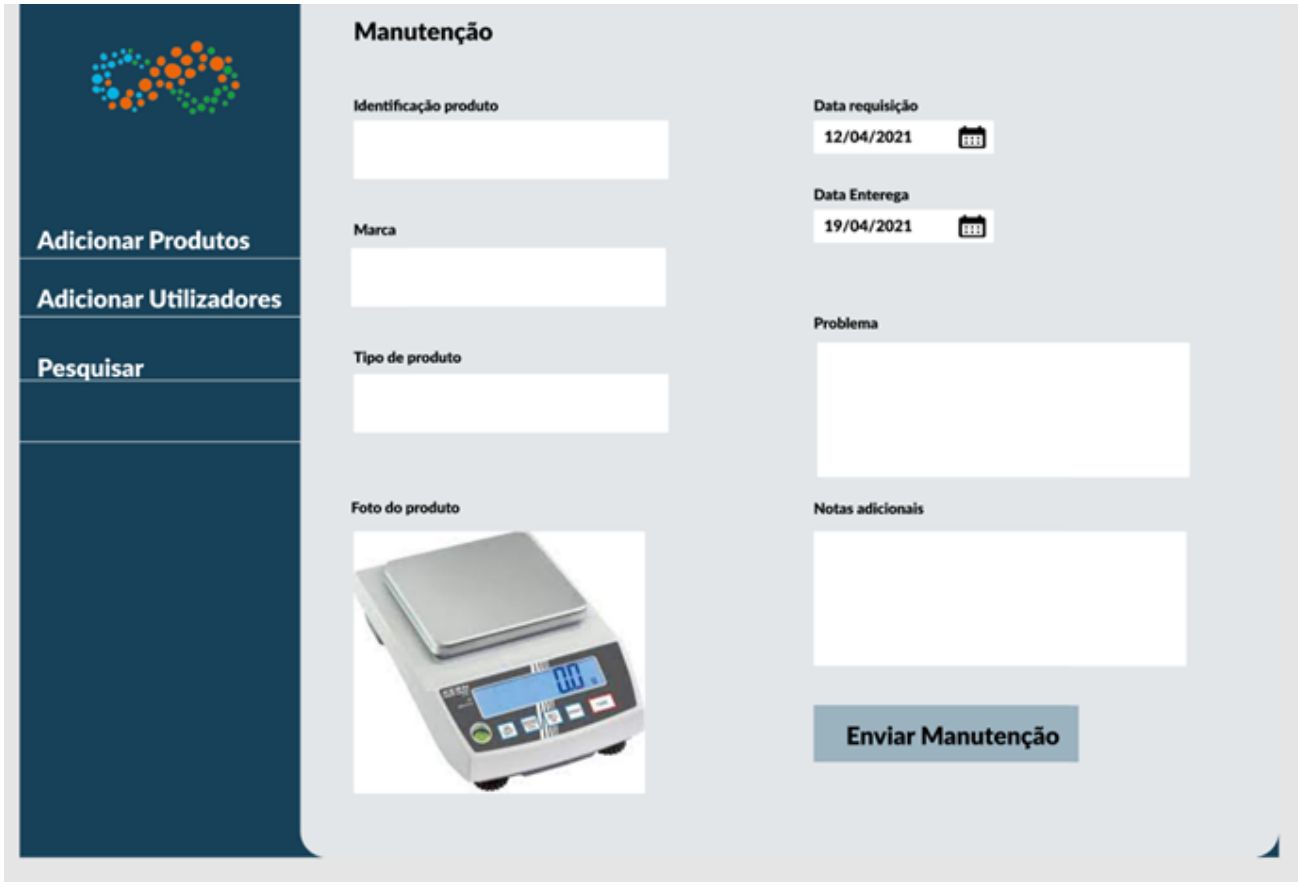


Figure 8 - Illustration of the Manutention.

Add a new Equipment

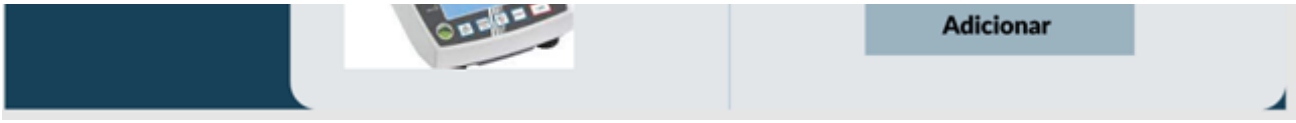


Figure 9 - Illustration of the add a new Equipment.

Add a new User

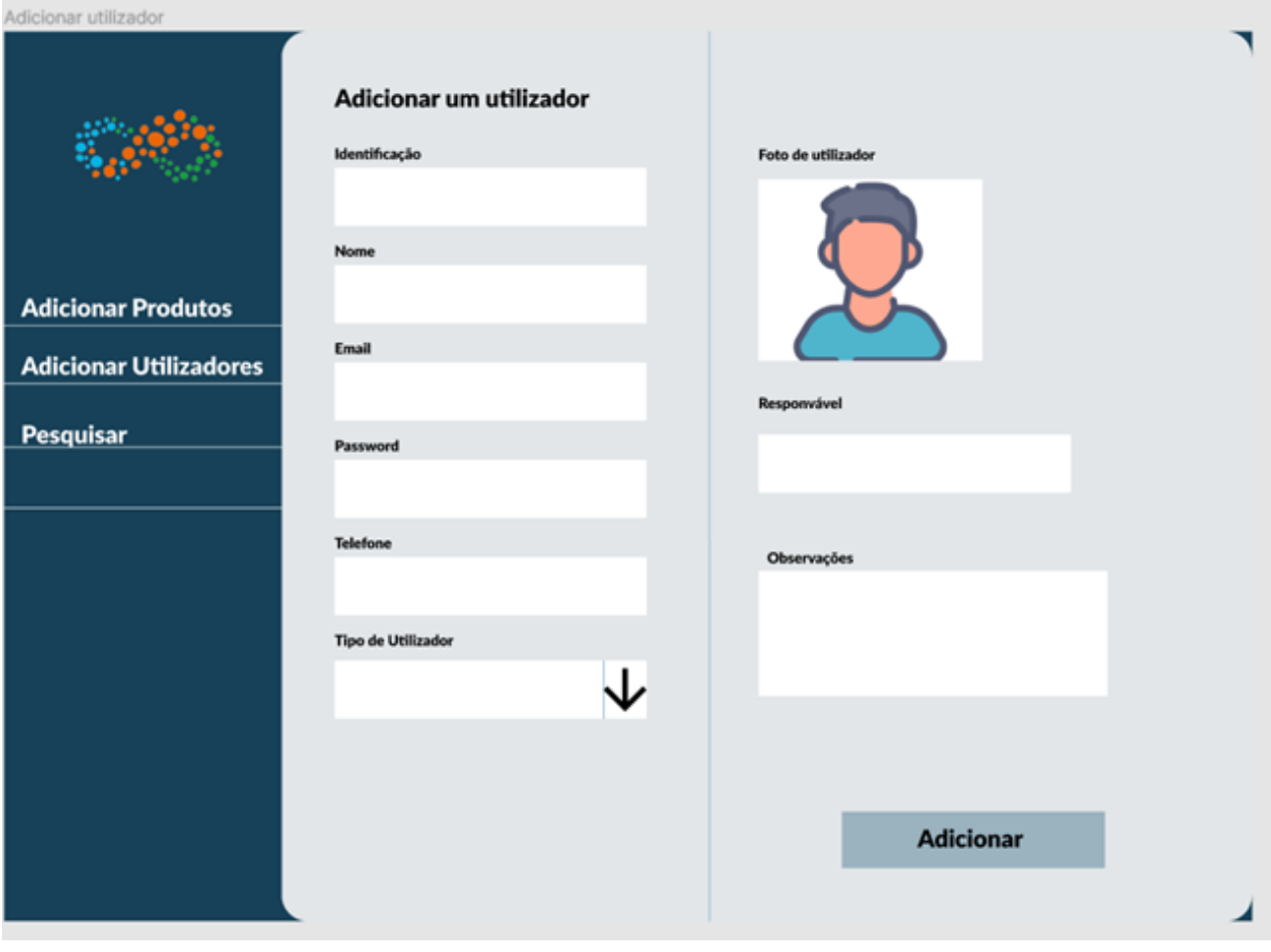


Figure 10 - Illustration of the add a new User.

Find a equipament

Figure 11- Illustration of the find a equipament.

Request Equipment

Figure 12- Illustration of the Request Equipment.

5. Practical Case/Project Developed

Login

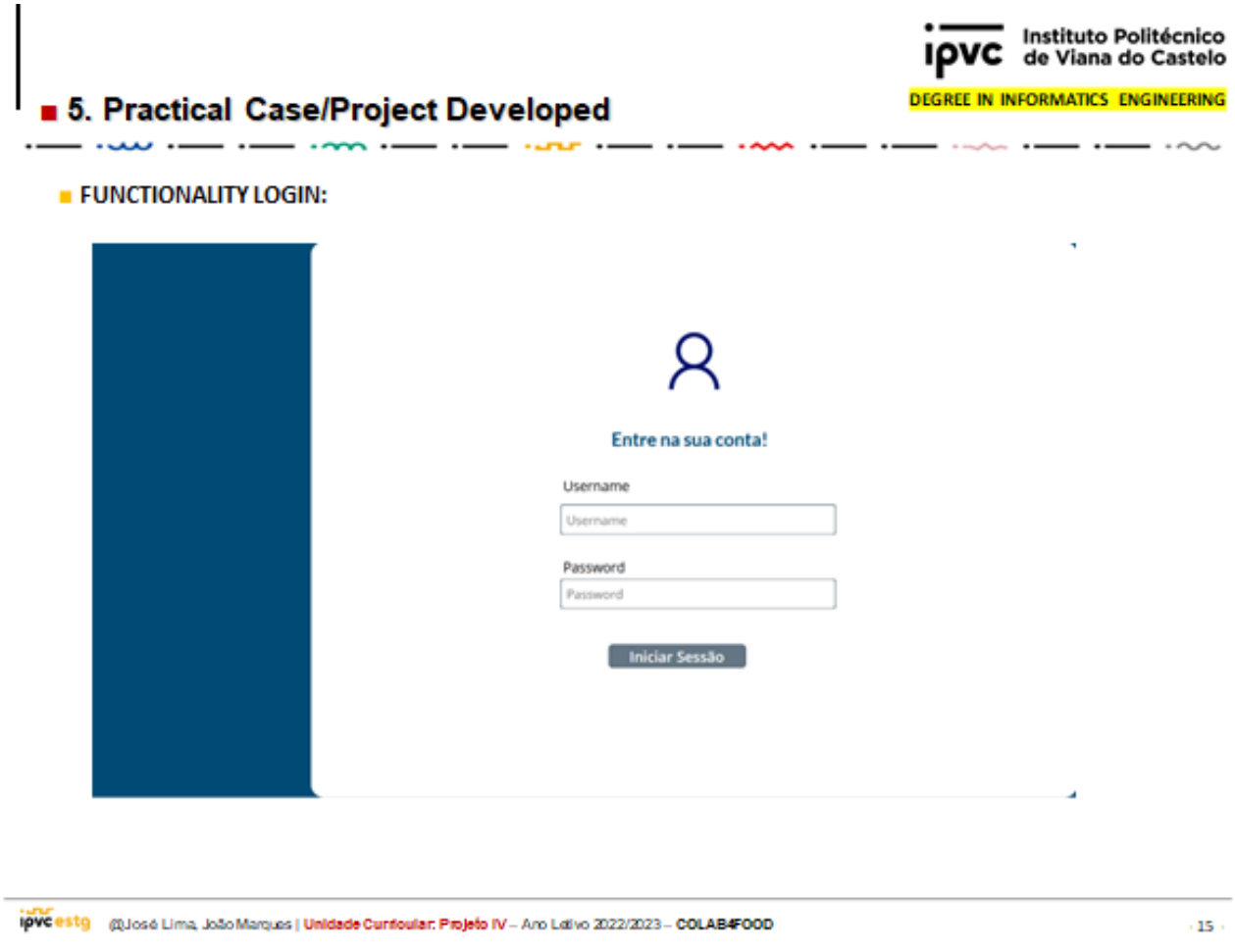


Figure 13 - Illustration of the Login.

Dashboard

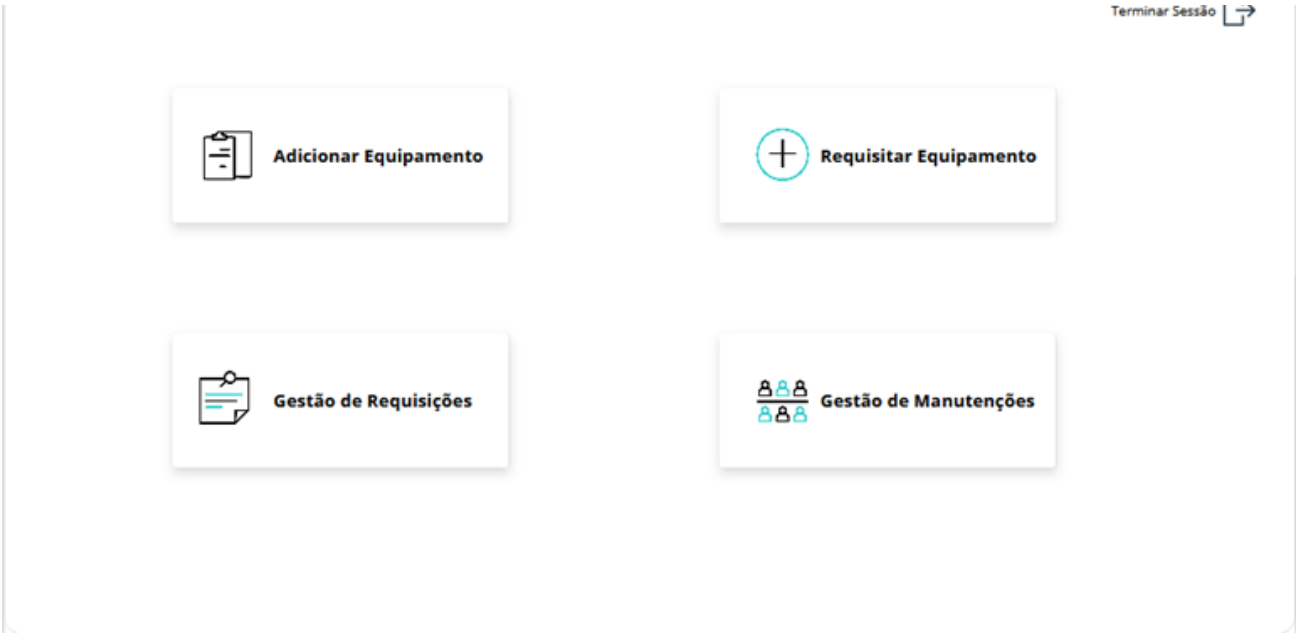


Figure 14 - Illustration of the Dashboard.

Equipment search

Figure 15- Illustration of the Equipment search.

Equipment information

Figure 16- Illustration of the Equipment information.

User equipment

Figure 17 - Illustration of the class diagram.

6. Difficulties & future features

6.1 Difficulties

- PowerApps recently updated the way its formulas are written and replaced the comma (,) with a semicolon (;), making it difficult to find updated tutorials and documentation.
- We found it difficult to understand the errors as there was little information about the error itself

6.2 Future Features

- Simplify the addition of equipment: Remove unnecessary fields, such as latitude and longitude, to make the adding process more straightforward and intuitive.
- Approval notifications: Implement notifications to inform users when an equipment request is awaiting approval.
- User interface improvements: Refine the layout and design of the application to improve the user experience and make it more intuitive and visually pleasing.
- Develop a notification system, so the equipment responsible knows when someone created a request, and the user knows when the request was accepted.
- Develop a “status” for each equipment, so everyone knows when the equipment is available to request or not.

7. Reviews

We would like to express our gratitude for the valuable contributions provided by users in the use of the application. Their feedback and suggestions have been instrumental in improving the functionality and usability of the system.

In addition, it is extremely gratifying to know that we had an evaluation with a score of 79 on the System Usability Scale, which is an almost Excellent, great for a first approach. This recognition and praise is motivating for us to continue to improve and expand the functionality of the application.

We sincerely appreciate the valuable feedback from Colab4Food users and are committed to reflecting hard on suggestions to meet users' needs even more efficiently.

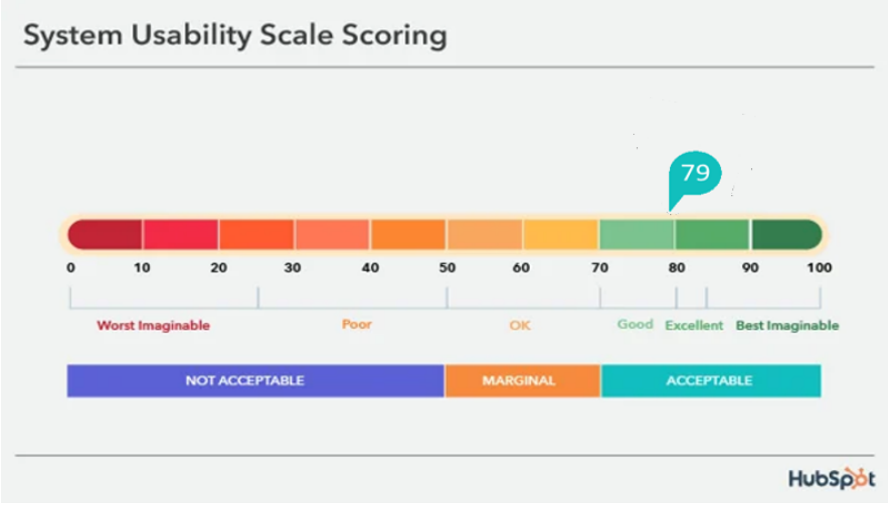


Figure 18 - Illustration of the System Usability Scale Scoring.

ID ↑	Nome	Respostas
1	anonymous	- Há materiais que poderiam não ter data de fim (por exemplo se um colaborador quiser pedir um rato, teclado etc) - Ao terminar sessão a expressão "terminar sessão " levar logo ou logout e não ser apenas o icone
2	anonymous	- Penso ser desnecessário a latitude e longitude na adição de um equipamento; - Testei a adição de um equipamento e não apareceu (como gestor). Em caso de necessidade de alguma aprovação, penso que poderia aparecer uma notificação do género "Aguarda aprovação"; - Após requisição de equipamento deve aparecer a informação do equipamento requisitado na lista pendente.
3	anonymous	Na parte das requisições alterar o formato da data, para permitir selecionar horas, p.e.x., upermitir agendar das 9-11 e depois outro utilizador das 14-15h Não consegui efetivamente marcar uma manutenção (através do login Gestor/Criador de equipamentos), não me aparece a listagem das manutenções, acho que era importante para se perceber o histórico de manutenções Na parte das manutenções também era importante só permitir selecionar os equipamentos que foram inseridos na base de dados Quando faço uma pesquisa por palavras-chave o botão de limpar não funciona
4	anonymous	Apesar de termos pensado esta aplicação sobretudo para equipamentos de laboratório, penso que poderá funcionar também para requisição de equipamento IT. Parabéns pelo excelente trabalho!

Figure 19 - Illustration of the suggestions from users.

8. Conclusions and Future Work

We would like to express our deep gratitude to my supervisors, José Evaristo and António Cruz, for their invaluable support and guidance during these 5 months of project development. We would also like to thank the company Colab4Food for the opportunity to participate in this project. It is important to highlight that the development of projects like this is an ongoing process. Based on user feedback and the company's ever-evolving needs, we are committed to continuing to improve and refine the application to better meet expectations and requirements. Thanks again to everyone involved in this project, including our advisors and the company Colab4Food. This experience was enriching and motivates us to constantly seek improvements and innovations in future projects.

9. Bibliography and Web References

9.1 Web References:

Used for specific components in power apps

- **Youtube**: https://www.youtube.com/@RezaDorrani

Used to remove doubts in syntax

- **Microsoft Power Apps documentation**: https://powerapps.microsoft.com/en-us/

Resolve doubts

- **Stack Overflow**: https://stackoverflow.com/

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2022 - 2023 Supervised by: Prof. Doutor. António Cruz, Prof. José Evaristo |