

**Faculdade de Engenharia da Universidade do Porto**



**LUNI**

**Final Report - Phase 1, 2 and 3**

**Group 3LEIC09G1**

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## Phase 1 - User and Task Analysis

### Project's idea description

LUNI aims to be the end-all-be-all platform for library related activities in FEUP.

As students of the university, when we were confronted with the challenge to design an app directed at FEUP students' necessities several ideas came to mind. One of the first discussed topics amongst the group was the parking lots, an idea quickly surfaced of creating some way for students and staff to be able to quickly decide where to park their car and help them find a spot. Thereafter an idea for a platform uniting FEUP's cantine and its 2 bars was discussed, the goal was to gather up all of the information on available menus, items, prices, and even order food in a single place so that the community had a clean and accessible way to plan lunches around campus. However, both of these ideas fell flat, as both of them seemed too simple and, as a group, we did not see ourselves using our very own products, that's when the LUNI project started to gain its form.

LUNI is a mobile and web application gathering all the information and activities necessary to efficiently and comfortably use all of the library's resources. It gives users real time information about the occupancy of rooms as well as individual sitting spots on the many library's floors and tables, this functionality aims to help visiting students find a comfortable place to sit without having to search each floor of the building, which is not only exhausting but might also disturb other students. Another key feature of LUNI is its emphasis on prioritizing the user's needs above all else, as such not only does it offer the opportunity to check on book availability and make reservations it also selects books according to the users currently attending units, however, the commitment to spread awareness for the benefits of consulting books doesn't stop there as there is also an online shop for them. However, and as we will discuss further on, there are more facets of the space that are many times forgotten mainly its events, in an effort to spread more awareness about them and deliver more news related to activities occurring in FEUP, there will also be a page advertising ongoing events and other library specific announcements.

## Related apps/services/systems

When analyzing the currently available market of library related apps we did not find any that truly took this topic in the same vein that we are trying to, therefore we took as our guidelines and competitors 2 closely related systems with FEUP's library. The first one being the library's very own website, an obvious choice for this project's theme and goals, and UNI, a student developed mobile application which already gathers several of the university's most important services.

### **FEUP's library website: a simple website for the SDI services.**

- |             |  |
|-------------|--|
| <b>Pros</b> | Access to a very big database filled with resources provided directly by the university; |
|             | Outdated interface which is hard for new users to get to grips with;                     |
| <b>Cons</b> | Lack of real-time information, mainly the number of vacant places;                       |
|             | Difficulty in finding physically available books and papers;                             |

### **UNI: an app developed by NIAEFEUP with the goal of providing easy mobile access to some of FEUP's services.**

- |             |   |
|-------------|---|
|             | Very big user base within FEUP;   |
| <b>Pros</b> | Already uniting multiple facets of the services necessary for the students in a single place; |
|             | Outdated interface which is hard for new users to get to grips with;                          |
| <b>Cons</b> | Lack of real-time information, mainly the number of vacant places;                            |
|             | Difficulty in finding physically available books and papers;                                  |

## Questionnaire

After leaving the questionnaire open for answers for about 1 week, sharing it within group chats, and asking for answers in person, a total of 17 people responded to the Google Forms.

The demography that was consulted was pretty homogenous, consisting of, in its majority, male students all of which with ages ranging between 19 and 20 and attending the 3rd year bachelor's from the L.EIC/M.EIC course [figures 4, 5, 6 and 7 of the Annex]. We are aware of how this may skew our general perception of our real user base that would encompass the entirety of FEUP's community, especially taking into account the small sample size.

When questioned about their personal experiences with the library's services the replies revealed that there were several different types of habits. Whilst it's almost unanimous that the services are accessible and that the most common activity in the library was studying and using the computers, the frequency of attendance to the library was not so straightforward. About one-third of enquirees use the library sporadically a few times during a month, while another third visit it once a week and only a quarter never attend it, with the remainder 1 answer claiming to use it multiple times per week. Events proved to be absent from all of the answerers' visits to the library with most of them pointing out a lack of interest and a lack of awareness of these events as the causes of not attending them. Still, in this section, we were able to understand that the majority of the people did not read or consult the literature required by their units as it didn't seem necessary or there were other formats not available in the library (video, websites, ...) [figures 8, 9, 10, 11 and 12 of the Annex].

Inquiring about the functionalities that we had planned and other platforms the data revealed that users are the happiest while using UNI, are comfortable with Moodle, and clearly do not like using Sigarra. For the minority of users that knew about the library's website, their experience with the website was negative. As for the relevance of the features that were planned, answers revealed a big interest in the availability of books as well as seats, whilst upcoming events proved to be not as relevant as expected [figures 13, 14, 15, 16, 17, 18 and 19 of the Annex].

With these results, we are able to, more accurately, organize our efforts in order to attend to what, at least, some of our potential users may want to see in this project. More precisely, the small number of answers that highlighted the library's events as a core part of its usage, as a student, has given us a greenlight to focus our attention on some other needs of the community, however our commitment to bringing these events to the attention of more students has not ended, while it will take a backseat in our priorities, the large number of answers that cited a "lack of knowledge" about said events have reinforced the idea that the lack of participation and knowledge about them may not necessarily stem from disinterest but rather a lack of awareness within the community's spaces. Furthermore, we will place special importance on the pages related to the library's spaces and its in-person usability. Taking a closer look at the implications related to the design and usability of the developing product, we must lean more into the practical and simple design philosophy demonstrated in UNI, which was significantly more popular than our chosen competitors, whilst trying to implement all of the rich content features present in the library's website that many are unaware of.

## **11 Questions**

### **1. Who are the users?**

This application will target all of FEUP's students, despite our questionnaire having had an admittedly skewed demography we are able to recognize, not only as developers but also as fellow students, the necessity for this kind of services.

### **2. What tasks do they perform?**

Currently, the library is used mainly as a study place. A smaller sample of answers revealed that there is some usage of the library's computers.

### **3. What tasks are desirable?**

Our main focus will be in the book domain, search and purchase of books, and the space domain, viewing and reserving seats. We also aim to have filters for these features and that the users are comfortable and have quick access to them. We will also give students the opportunity to consult and register in events.

### **4. How are tasks learned?**

Tasks are learned through repeated use of the application and are also inherited from previous knowledge, something that we expect given the simplicity of the app.

### **5. Where are tasks performed?**

They may be performed in any one of these digital mediums: computer, mobile phone or tablet.

### **6. What is the relationship between user and information?**

Users must share some of their Sigarra information with the app, information that will not be shared with other users. Although there is still sensitive information in the app related to purchases users showed they were comfortable with digital payment methods.

### **7. What other instruments does the user have?**

Users are still able to visit the library in person, being able to talk to its staff, or consult the library's website.

### **8. How do users communicate?**

Users do not communicate within LUNI; therefore, we did not analyze this concern.

### **9. How often tasks are performed?**

We expect that the most common tasks are the ones related to the use of the library space, mainly reserving and searching seats, followed up by book domain's activities. Events were shown to not be as relevant as expected.

**10. Are there time restrictions?**

While LUNI must be fast and responsive it is not time sensitive. However, it should be noted that while actions may be performed at any time of the day, there are still restrictions that do apply, being that they are tied to the regular functioning hours of the library.

**11. What happens if something goes wrong?**

Failure of the system is not critical, while it might be undesirable, users may always visit the library in person.

## Personas

In order to create a profile of our potential user base we created 3 personifications of people with goals that encompassed the ones highlighted on the questionnaire and some of the teams' goals for users that use this application. From this, 3 personas were born, Ellis, "The Out of Town Student", Lucas, "The First Job", and Maria, "The New Learner".

**Ellis Santos**



AGE 20  
EDUCATION 2nd year bachelor's  
FAMILY Girlfriend, parents  
OCCUPATION Full-time Student  
LOCATION Lisbon, Benfica  
TECH LITERATE Professional  
ARCHETYPE The "Out of Town Student"

**Core needs**

“ Despite my shortcomings and circumstances I'll do my best and beat the challenges that stagger of me!

Always hungry for more knowledge and to adopt new technologies, they are interested in integrating new apps in their daily lives.

Since Ellis' knowledge of the city, and more specifically the cities' libraries, is limited it is important for them that the most important bibliographic references of their units are readily and hastily available to them.

Ellis aims to always feel comfortable in public spaces as such the app should allow them to monitor the library's occupancy accurately.

**Personality**

Introverted Responsible  
Perfectionist Anxious

**Platform**



Website Smartphone Other

Figure 1

**Lucas Mendes**



AGE 23  
 EDUCATION 1st year master's  
 FAMILY Parents  
 OCCUPATION Part-time Student  
 LOCATION Maia, Águas Santas  
 TECH LITERATE Below Average  
 ARCHETYPE The "First Job"

**I don't have time for a quote...**

**Personality**  
 Impatient Hard working  
 Cautious Competitive

**Platform**  
  
 Smartphone

**Bio**  
 After studying for 4 years Lucas has finally landed a job and intends to hold onto it with his whole might. Getting here however was not easy and he went through many hardships right from the start. In his first year of university he was held back due to medical complications he could not have foreseen. After recovering in the hospital for the better part of a year Mendes returned to his studies and gave it his all, unfortunately a security vulnerability in the universities mobile payment method meant he lost 300€ to a scammer, only being able to receive a refund recently. Now with new goals and a job to cater to Lucas won't take "no" for an answer and will try his hardest to overcome the hardships he faced in the past years and finally finish his degree and establish himself as a valuable and integral part of his work team!

**Core needs**  
 Being that time is limited as he has to juggle both his job and his education, Lucas needs to be aware of available studying spots at a moments' notice.  
 Given his past unfortunate experiences with online transactions,  

- he must feel comfortable and confident about his information on the app.
- Without much time to adapt and comfortably use his computer, Lucas must have access to the app on his phone.

**Frustrations**  
 As Lucas' experience with technology is quite limited and not pleasant he might feel frustrated to have to use an application instead of simply asking for information in person, whether to classmates or faculty workers.  
 He is frustrated with his situation and stagnation when compared to his peers, this fact makes him easily irritable, which in tandem with his already impatience grants him a short fuse in stressful or time sensitive situations.

Figure 2

# Maria Joana



**AGE** 18  
**EDUCATION** Highschool  
**FAMILY** Parents  
**OCCUPATION** Full-time Student  
**LOCATION** Bragança, Samil  
**TECH LITERATE** Average  
**ARCHETYPE** The "New Learner"

**“** It's time to become a new person!

**Personality**

- Extroverted
- Clumsy
- Cheerful
- Kind

**Platform**



Website    Smartphone

### Bio

Maria has just enrolled on her first year of university, and is looking forward to not only learn all about her course but also about her new environment. As she is from a small rural town in the interior of the country, contact with new people her own age was scarce and her current situation has presented her with the possibility to get in touch with more people and make new connections. Perhaps stemming from the isolation inherent to her situation in her highschool years, Maria has developed a reasonable level of understanding of technology and is quite comfortable with any means of interacting with it.

### Core needs

Since Maria is a freshman in university, the desire to meet new people and explore new relationships burns in her this means

- that it is important that Maria is able to meet with her friends in order to study efficiently and communication such information is also of her interest.

With a very active life comes a diminishing amount of time to do

- certain activities such as reading and she will be happy to be able to prioritize the most important aspects of her library usage.

### Frustrations

Despite being quite comfortable with technology, some things

- do not come to her intuitively. She will need to be able to quickly learn her away around the application.
- With many eyes on her at some times she will avoid spending a lot of time on her devices consulting the app.

Figure 3

## Activity scenarios

There were 3 activity scenarios made, one for each persona, based not only on their respective description but also on feedback from the aforementioned questionnaire. The first scenario follows Ellis and their group's struggles to finish a project, the second one stars Lucas as he must find a book for one of his course units', which he is able to accomplish using Luni, and, lastly, Maria plans to meet new people and engage more with FEUP's activities through the library, with the aid of our app.

Ellis has just returned from a weekend with their family in Lisbon. For the past 2 days, Ellis had been going around their home city visiting their extended family and hanging out with their girlfriend, for what was certainly for her not enough time. Upon returning to Porto and to her accommodation in the city Ellis is struck with the realization that an upcoming delivery has been brought forward a couple of days and their work has just been thrown completely off schedule. With this in mind, they contact their friends from their group who are also unaware of the occurrence, and quickly try to hatch a plan to be able to deliver everything they must on time. However, as this plan requires a few physical deliverables to be made the group can't simply hop on an online call and work away. Ellis quickly searches on their computer for LUNI's page and navigates to the "Availability" section. There they can check on the currently occupied rooms and tables as well as check on a prevision of the changes in occupancy in the upcoming hours. Upon figuring out that their favorite room is available they quickly book it for some time that afternoon and let the rest of their group know about it from within LUNI's interface. They are then able to meet up, finish up their project in a comfortable environment and even have some time left to hang out afterward, which always helps Ellis cool down from a very busy weekend and day.

After getting off of work for the day Lucas notices a new notification on his phone, the page for one of his units this semester has just been updated and the year's group chat is going nuts with it! The professor has declared that the previously supplementary reading has now become mandatory and that practical lessons shall be replaced by its reading. With little time to react to the news and determined to not fail the unit Lucas has no other choice but to get his hands on a copy of the book as soon as possible. While reading the messages that are flying around on his phone, he remembers that the library might have the book on its shelves or maybe even for sale. Lucas opens up the LUNI app and is greeted by several recommendations for his enrolled unit's bibliography, as he prepares to start searching the book within the database he notices it sits directly on his home screen. He is then able to confirm that is indeed the correct book for the class and immediately checks its availability, which unfortunately reveals to him that the book is currently not available, but that there are more copies on their way. Lucas quickly orders one of the copies feeling comfortable that his billing data is secured in the app and selects the option for an in-person pick up of his order. He then goes back to the group chat to advise his colleagues on what he had just done, and gloat a little about his quick thinking.

It is Wednesday morning and without any plans for the afternoon and wanting to be involved in some activities at the university Maria is asking her friends if they have any plans for the day. Whilst most of them have some sort of family issue to take care of one of her more distant friends, Mariana, points out that a book-sharing event is going on in the library. Maria sees this as an opportunity to develop her bond and takes up Mariana on her idea, who seemed pretty weary to share it in the first place. They both reach for their mobile phones and check LUNI's event tab, where they

immediately find highlighted that day's events. After reading some more about the event and even pondering on attending another one at a different university, they are able to quickly register themselves and are set for that afternoon. Maria and Mariana spend a great afternoon together talking about their favorite books, and music and getting to know each other better, by the end a strong bond has been formed.

## Simplified conceptual model

Stripping down all of the UI ideas that were flowing through the team discussion we were able to build the following conceptual model, which allows us to get a better feel for what users, in essence, will be able to do in LUNI.

### Objects (attributes)

- User (name, photo, courses)
- Book (title, cover, summary, status, courses, sellable, price);
- Seat (location, status);
- Location (floor, characteristics);
- Events (date, title, description, registration fee, capacity);

### Actions

- Consult book status;
- Reserve, buy books;
- Recommend, get recommendation;
- Find available seat and book it;
- See events;
- Register in event;

### Relations

- Book has associated status;
- Books on sale have price;
- User is enrolled in courses;
- Books have courses associated;
- User have book recommendations;
- Seat has location;
- Rooms are a group of seats;
- Location has characteristics;
- Users can register in multiple events;

## Functionalities and tasks

The following are some functionalities with their respective tasks associated, we aim to give a better understanding of our idea for a user interaction with the application in this way, it helps us convey the how our ideas come to life in the user's hands and needs.

Functionalities	Tasks
Search for a seat	Search for an available seat with computer access on the third floor
Buy a book	Buy a book from a course I'm enrolled that has a price below 20€
Register in an event	Register in the spelling contest that will take place next week

## Usability requirements

For each domain of activities that we have planned for LUNI we have created some requirements to fulfill its usability by a metric that we feel comfortable that the users experience without any gripes or major issues, dividing this notion into 3 realms of efficacy, "How well?", efficiency, "How fast/much effort?", and satisfaction, "How comfortable?". The scenarios present an example of what one might expect when accomplishing a task in one of each of the domains that are present in LUNI, the first one in the space domain, followed up by the books domain, and the third one the events domain.

### Search for an available seat with computer access on the third floor

<b>Efficacy</b>	80% of the users reached an available seat in their first try
<b>Efficiency</b>	Average time of finding a seat with that criteria below 1 minute. Selecting third floor and computer access in 4 or less clicks
<b>Satisfaction</b>	Less than 15% of users unsatisfied with map display

### Buy a book from a course I'm enrolled that has a price below 20€

<b>Efficacy</b>	If the book is available, all the users tasks should have a success rate of 96% or above
<b>Efficiency</b>	Average time of processing the transaction below 2 minutes.
<b>Satisfaction</b>	90% of the users should be pleased with the navigation system

### Register in the spelling contest that will take place next week

<b>Efficacy</b>	The registration process has to be completed within 3 tries
<b>Efficiency</b>	The searching process should be possible to do with 6 or less clicks
<b>Satisfaction</b>	95% of the users should consider the registration process to be practical

## Conclusion

These efforts have revealed that we are on the right track to build an app that feels needed and wanted by FEUP's community. Our initial goal of bringing a more welcoming way of interacting with the library digitally has been reassured, not only by the answers of the questionnaire but also our further investigation of this very issue. However, we are still mindful of some of the possible shortcomings of our project, mainly in the issues related to events.

It's important to stay aware that this is an initial procedure that does not account for the specifics of the aesthetics and UI elements of the application, it simply focuses on the building blocks that are important when tackling these other issues.

## **Phase 2 - First Prototype and Heuristic Evaluation**

### **Project's description**

LUNI is a mobile and web application gathering all the information and activities necessary to efficiently and comfortably use all of the library's resources. It gives users real time information about the occupancy of rooms as well as individual sitting spots on the many library's floors and tables, this functionality aims to help visiting students find a comfortable place to sit without having to search each floor of the building, which is not only exhausting but might also disturb other students. Another key feature of LUNI is its emphasis on prioritizing the user's needs above all else, as such not only does it offer the opportunity to check on book availability and make reservations it also selects books according to the users currently attending units, however, the commitment to spread awareness for the benefits of consulting books doesn't stop there as there is also an online shop for them. However, and as we will discuss further on, there are more facets of the space that are many times forgotten mainly its events, in an effort to spread more awareness about them and deliver more news related to activities occurring in FEUP, there will also be a page advertising ongoing events and other library specific announcements.

The tasks selected as basis for the prototype's wireflow were:

- Buy a book from a course I'm enrolled that has a price below 20€;
- Search for an available seat with computer access on the third floor;
- Register in the spelling contest that will take place next week;

## Prototype's Wireflow - Spots

The following represents the flow of the task “Search for an available seat with computer access on the third floor”, including a demonstration of the flow, when a seat is taken as well as a free seat.

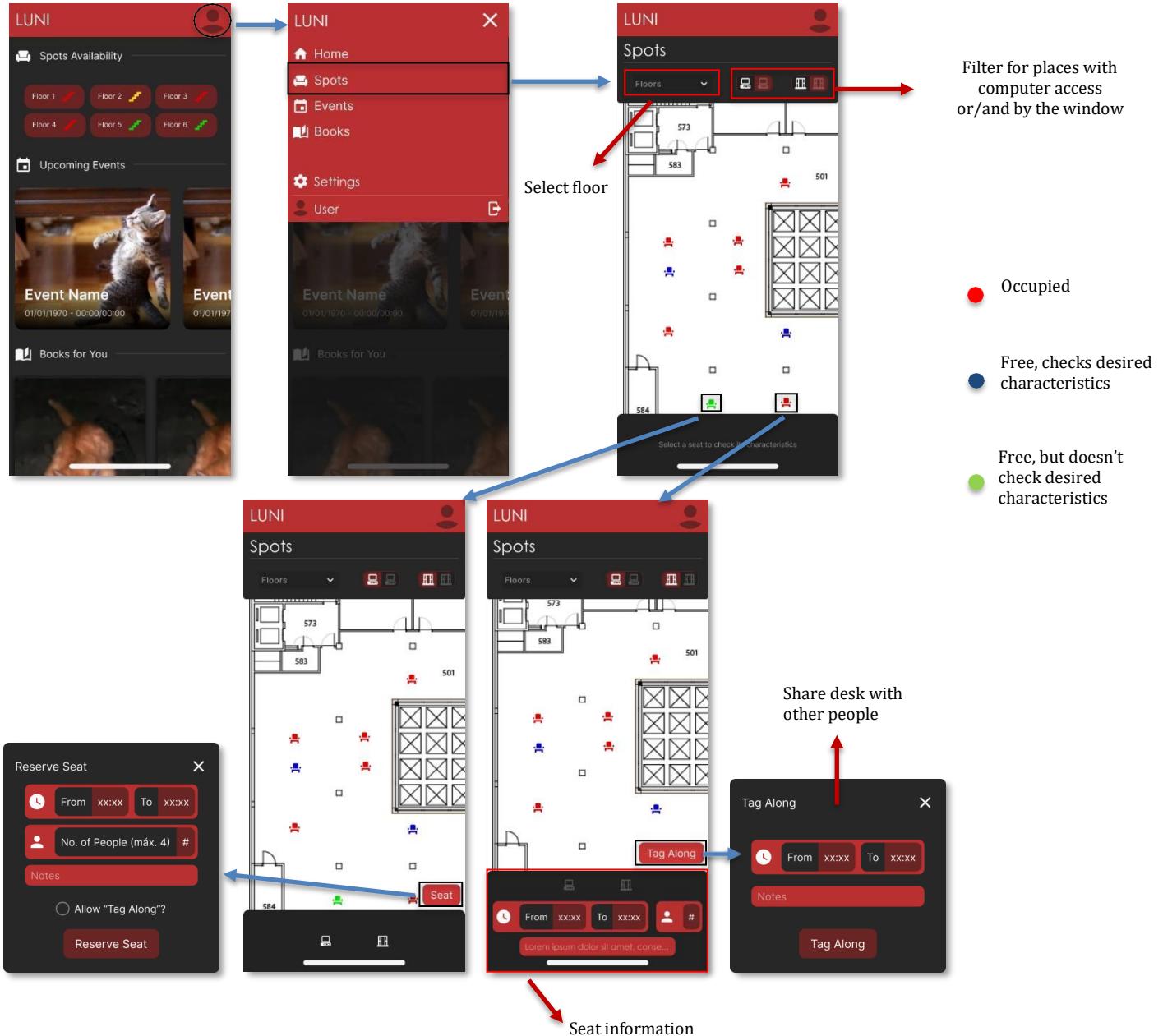


Figure 4

## Prototype's Wireflow – Books

The following wireflow represents the flow of the task “Buy a book from a course I’m enrolled that has a price below 20€”.

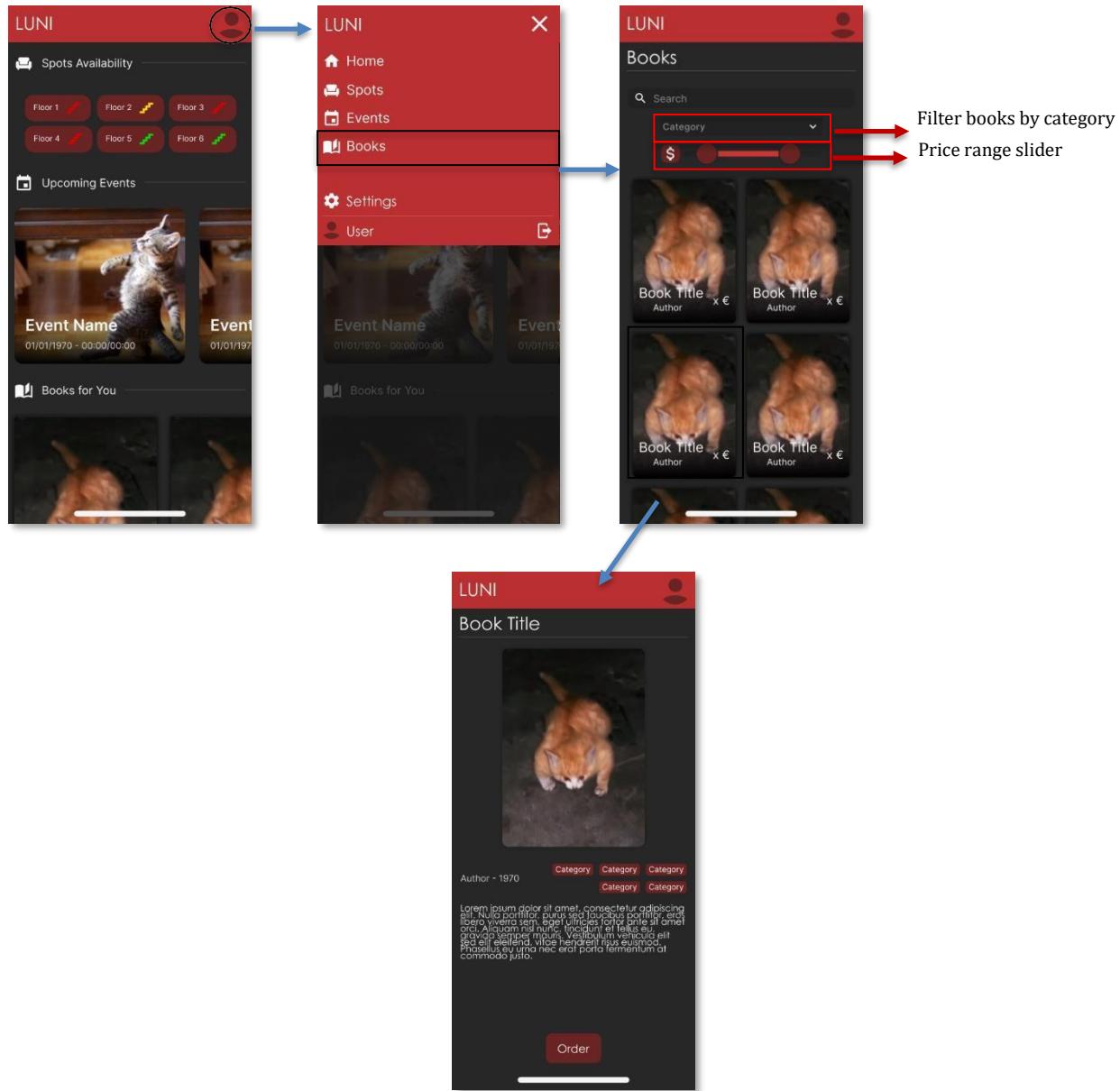


Figure 5

## Prototype's Wireflow – Events

The following represents the flow of the task “Register in the spelling contest that will take place next week”.

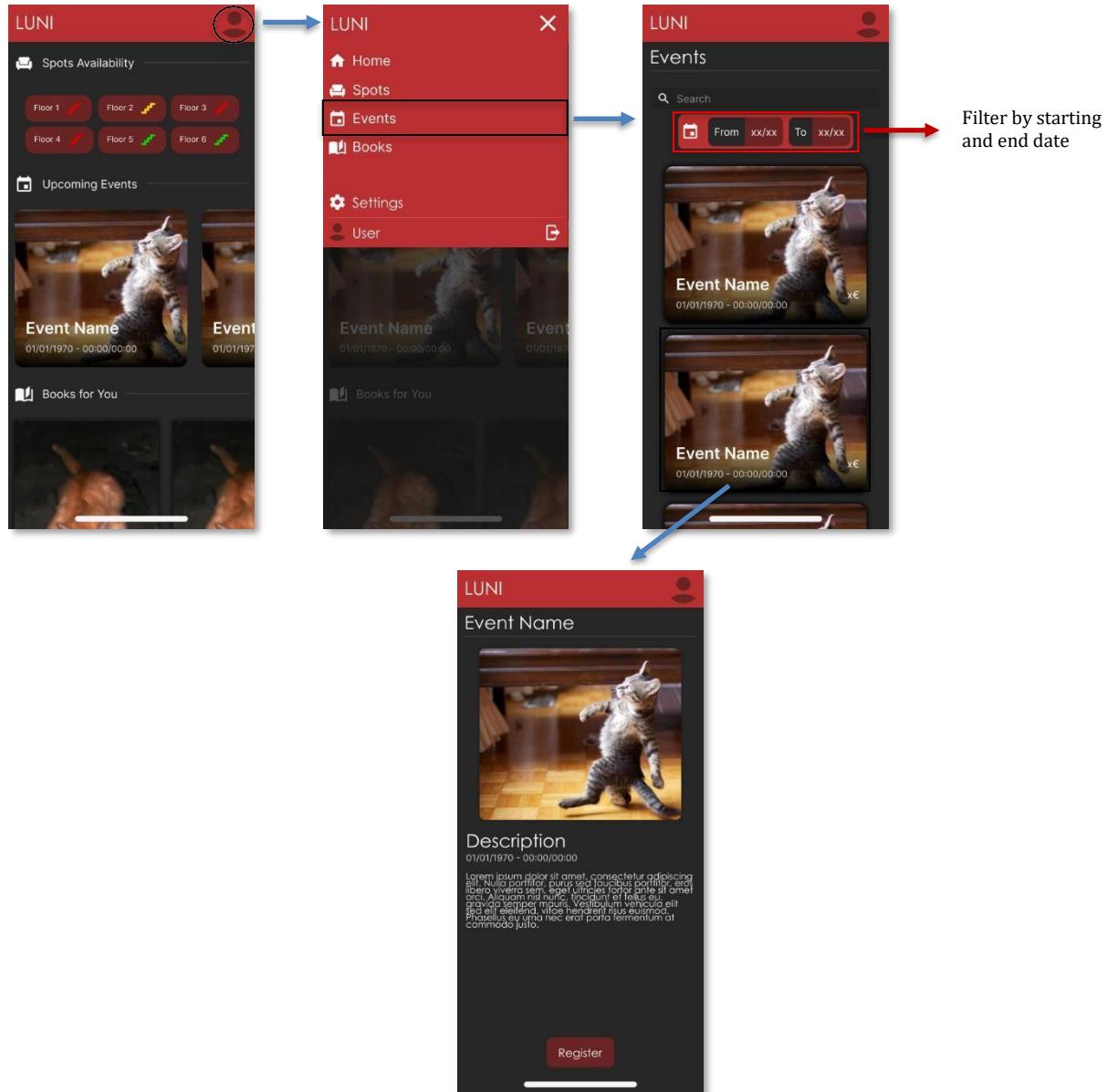


Figure 6

## Heuristic Evaluation Results

In the feedback from the other groups heuristic evaluation, we got the following results:

Issues	Severity (1-4)	Heuristics
No buy/seat action feedback	2	1
Slider without values (Book's menu)	2	1
Separation between “Upcoming Events” cards (main menu slider)	2	1
Inconsistent coloring (Both in main menu and spot's menu)	2	4
Lack of Help page	1	10
Lack of icon clarity (Spot's menu)	1	3, 4
Lack of Documentation page	1	10
No “Back” button	N/D	1

Furthermore, from the presentation class we were also alerted for an issue related to the Order/Buy button in the “Book” page, the semantics of the text on this button is not clear and as such a better solution must be devised, to correctly demonstrate the options of buying and ordering. In this same class we were also alerted to another issue regarding the slider for filtering prices, which in its' current state lacks intractability and is not a good mobile solution.

## Corrections to perform in Phase 3

This feedback allowed us to define a strategy for the Phase 3. First, we grouped these issues in three different groups so it would be easier to tackle them.

In the first group we have the issues that we were not previously able to detect, and we believe must be dealt with up front.

Issue	Correction
Separation between “Upcoming Events” cards	Increase the spacing between the cards
Lack of icon clarity	Change icons for more expressive ones
Inconsistent coloring	Refactor coloring or add a color legend
No “Back button”	Add “Back button”

In the second group we have issues that didn't seem to be as closely related to the current phase's goals, but we would still like to tackle them in the future.

- Lack of Help page;
- Lack of Documentation page;

Finally, in the third group, we have issues that, with the tool we are currently using, Figma, don't seem to be feasibly tackled. As such, we will look into migrating into a different, more suited, environment in the future.

- No buy/seat action feedback;
- Slider without values;

Regarding this final group, we found the most pressing issue to be the “Slider without values”, this belief was then corroborated by the teacher in the feedback or presentation. The current solution does not fit along with the usability goals of a user on a mobile device, in fact hindering the overall experience in the app, as such we will look into fleshing out a better solution for this problem.

The issue regarding the mismatched meaning and language of the “Book” page will also be taken care of in this phase, in its’ current state, it does not correctly convey to the user the meaning and planned functionality of that page. As we have previously mentioned and defined in the previous phase, we want users to be able to buy, order or rent books, and our current solution does not allow for a correct expression of these goals.

## Conclusion

This phase marked the start of the prototyping stage, the first prototypes were designed based on the features that were planned in the previous phase, this allowed us to have a first look at what our future application might end up looking like and helped us define more clearly how we should implement the planned tasks in order to guarantee a solid and enjoyable user experience for our users. The tool chosen for prototyping was Figma, as the group already had some experience with the software.

Following the prototyping stage, a heuristic evaluation was conducted by our peers, feedback was given regarding the experience and usability of our application when attempting to accomplish the previously defined tasks. This was also a fundamental step, as we believe we would not have been able to notice some of the issues pointed out to us during this stage on our own, this process made the importance of peer reviewing the prototype clear and will greatly help us in the following stage. Following this evaluation, and with more feedback from the teacher, we established the corrections to be performed in the next phase.

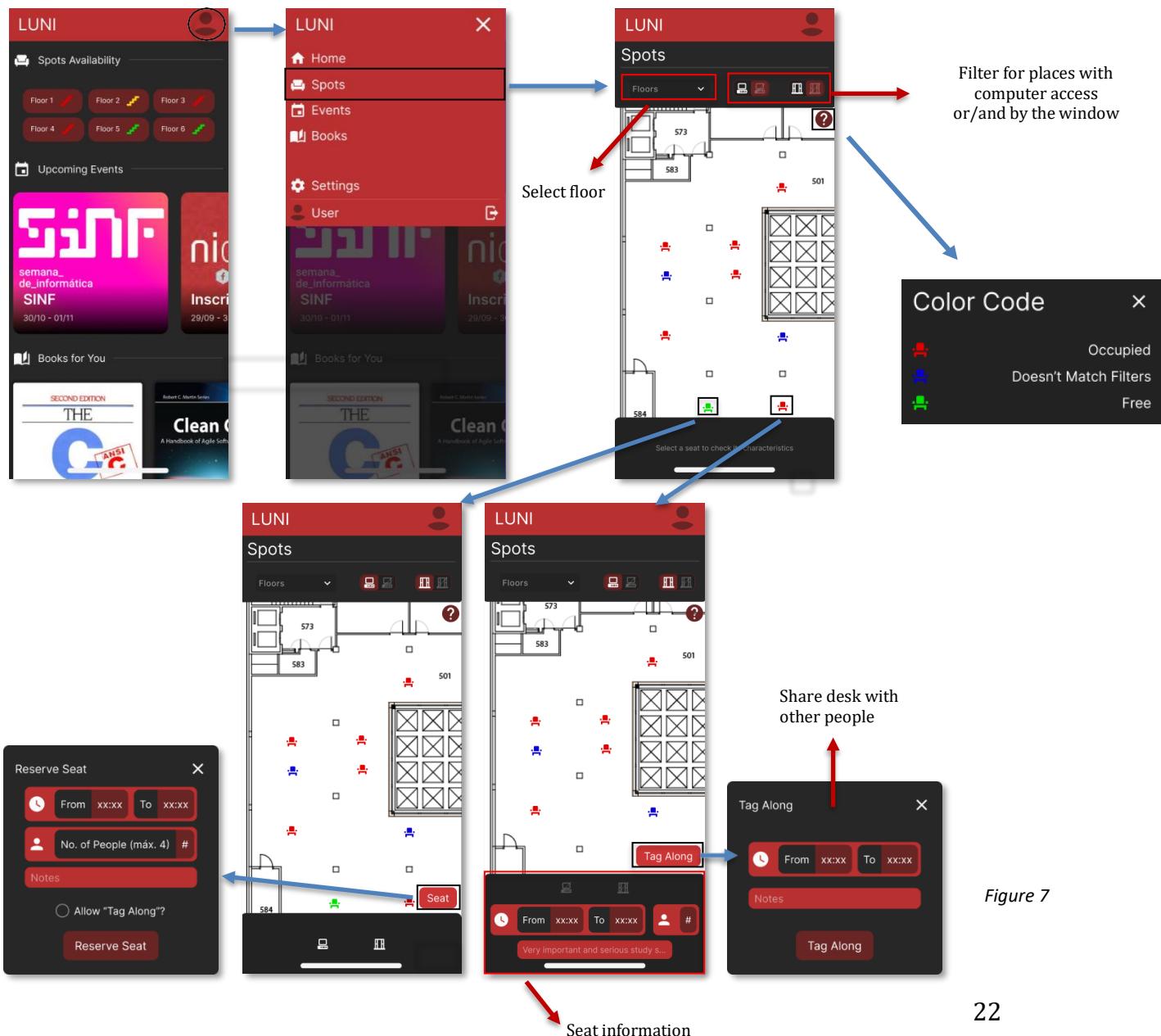
In conclusion, the now closing stage, was not only creatively enticing, during the development of the prototypes, but also enlightened us to the weaknesses of the product we had constructed up until that point, which will surely be helpful in the upcoming phases, as they allow us to plan and devise strategies to develop a better final product.

## Phase 3 - Second Prototype and User Evaluation

### Prototype's Wireflow – Spots

From the first prototype, by taking into consideration the feedback from the heuristic evaluation, we changed the symbols of “no computer access” and “not by the window” to more expressive ones. From an informal discussion with the evaluators of the previous prototype, the issue of the readability of the colors in the map came up, as such, we added an informational pop-up with an adequate description.

The following represents the flow of the task “Search for an available seat with computer access on the third floor”, including a demonstration of the flow, when a seat is taken as well as a free seat with the new changes.



## Prototype's Wireflow – Books

From the heuristic evaluation and the teacher's feedback we knew the price slider was an issue that we needed to tackle. In fact, the value selected wasn't clear and it was impractical for a mobile application. With this in mind, we replaced it with a dropdown menu. The other issue tackled during this phase was the distinction between the page of a book available for purchase and the page of a book available for reservation.

The following wireflow represents the flow of the task "Buy a book from a course I'm enrolled that has a price below 20€" with the new changes.

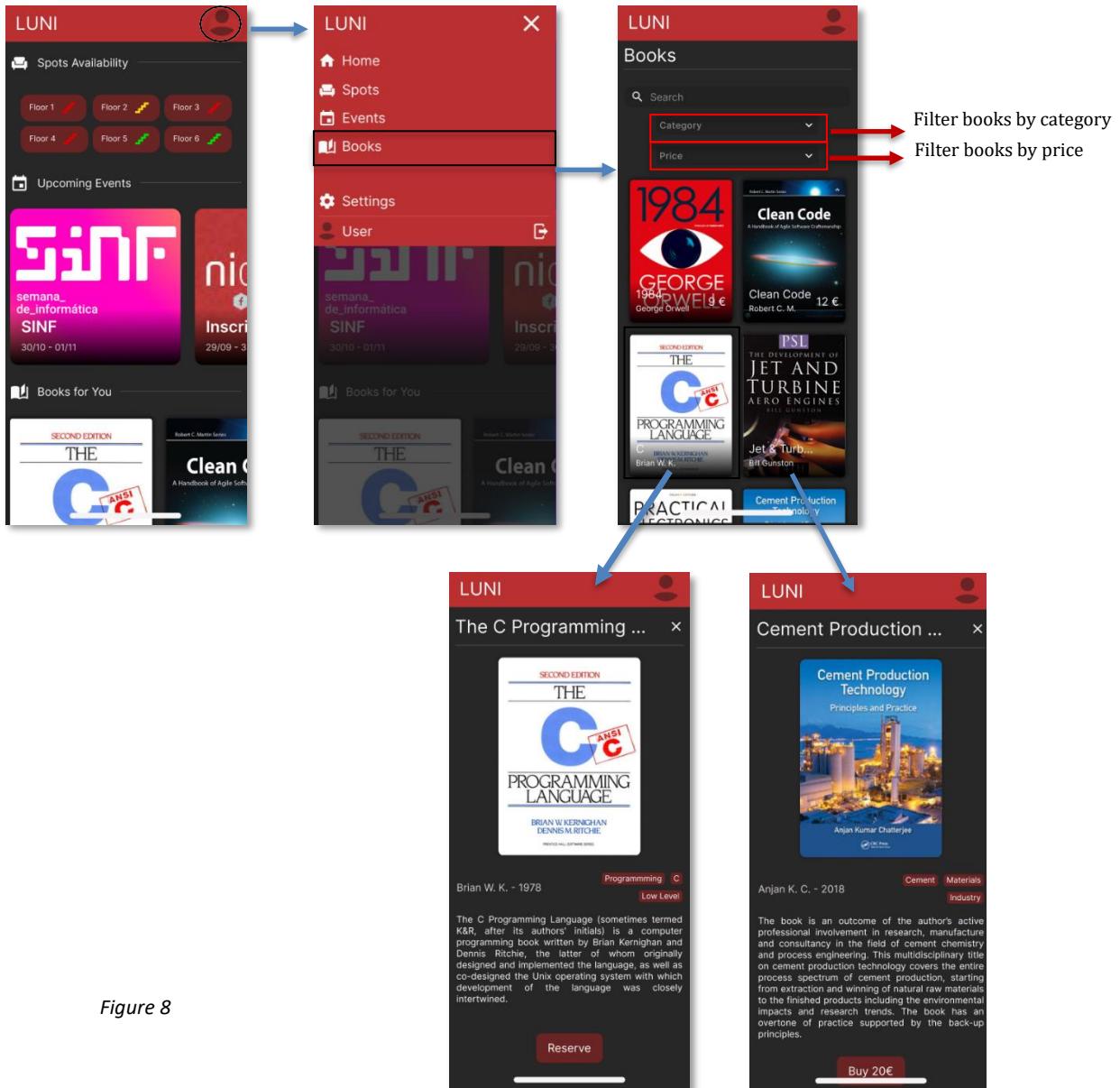


Figure 8

## Prototype's Wireflow – Events

Regarding the events sections from the heuristic evaluation. Consequently, we didn't have any issues to tackle in this phase. Being the replacing of the events template for concrete events the only change we made. This change was fundamental for the user evaluation.

The following represents the flow of the task “Register in the spelling contest that will take place next week” with the new changes.

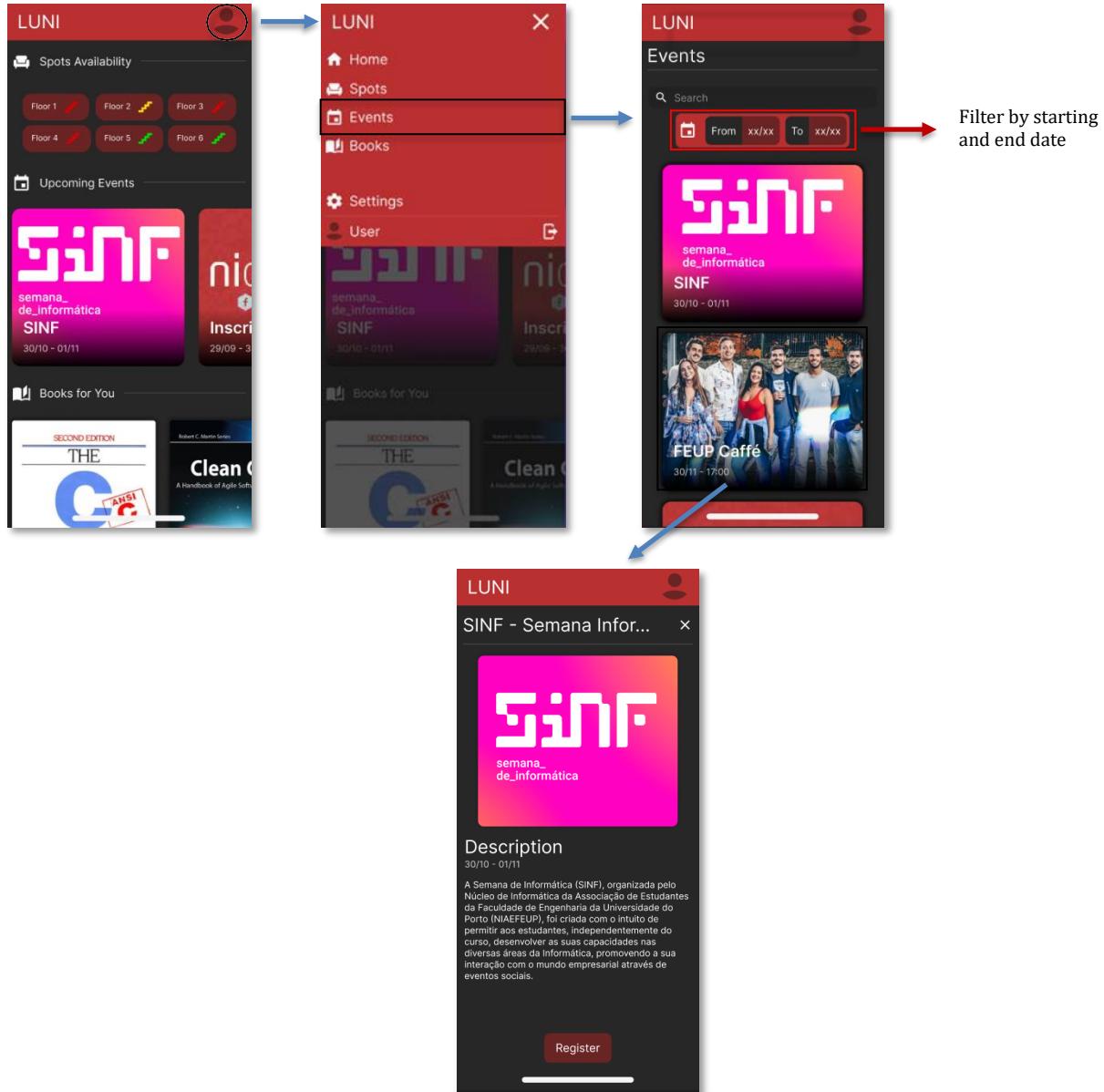


Figure 9

## Prototype's Wireflow – URL

All of the previously described prototypes can be tested through the following Figma URL, <https://www.figma.com/proto/5DJpALphcu0Z5BToKZdGKT/Luni?node-id=13%3A122&scaling=scale-down&page-id=0%3A1&starting-point-node-id=13%3A122>.

## User Evaluation Protocol

### Objective

The evaluation session focused on evaluating the intuitiveness of the app, how easy it is for the user to get comfortable with the app and all its features, and its visual aspect. In order to accomplish this, the users were asked to complete a task for each of the app's domains and answer a few questions. This evaluation also served as a way to validate the fixes previously implemented.

### Users

The participants of this evaluation sessions were college students with ages between 17 and 22. Whilst almost everyone studied in the city of Porto being, the majority studying at FEUP, there was a good amount of students from different courses that partook in the evaluation.

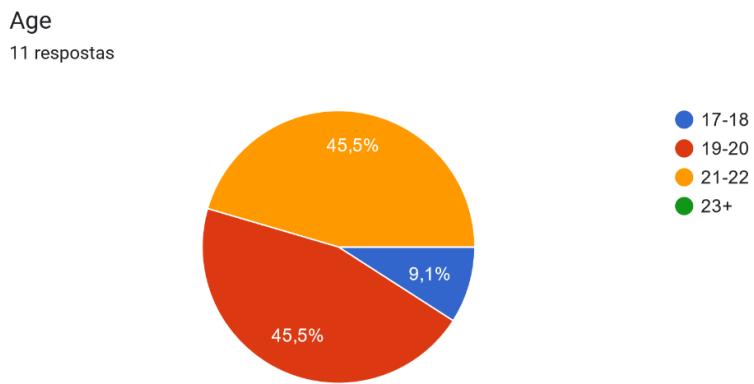


Figure 10

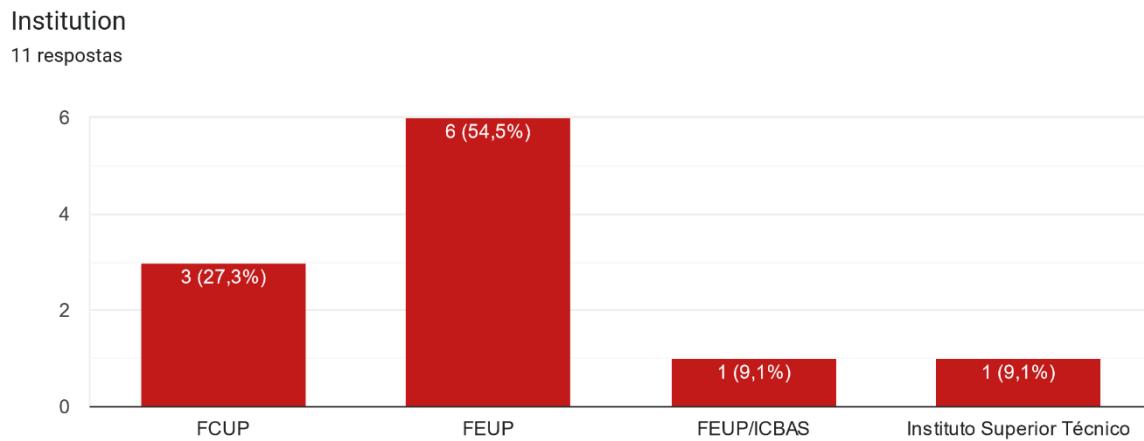


Figure 11

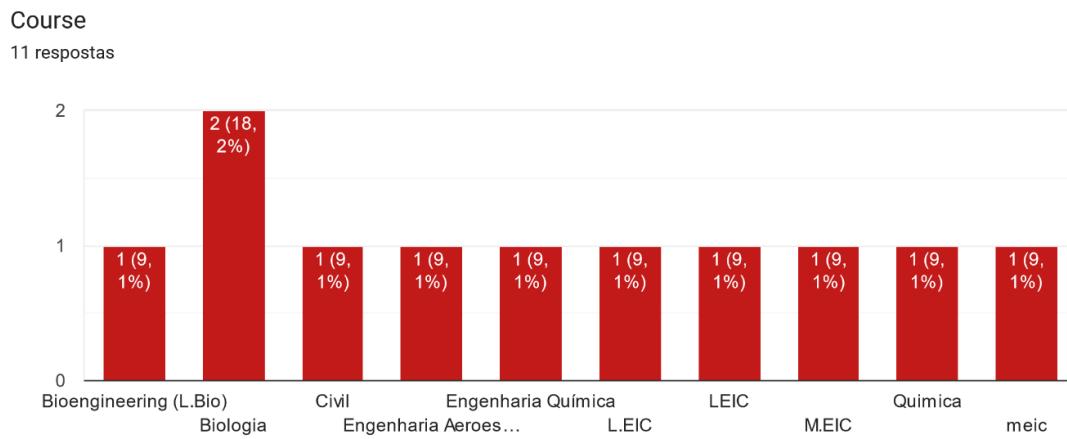


Figure 12

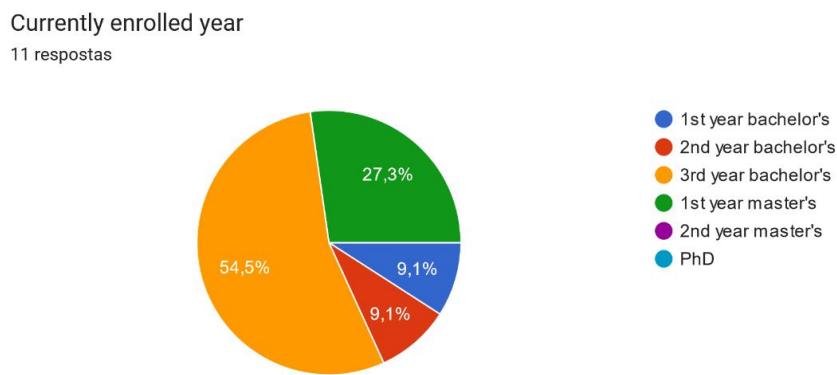


Figure 13

The comfort of the users with similar purpose applications and web services was also studied, with a decent level of previous knowledge and comfort being reported. It is also important to note the preference of the users for the Moodle platform in comparison with the other options.

What's your comfort/knowledge level with these kinds of applications?

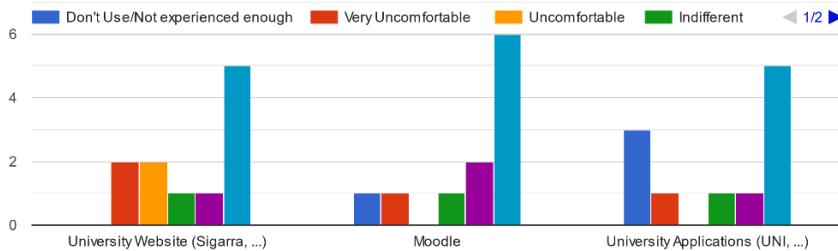


Figure 14

The evaluation was realized mostly on the computer browser, this was an important metric to access, as we had concerns with the fidelity of the Figma prototype when used in a mobile device or the mobile app.

Where did you realize this test?

11 respostas

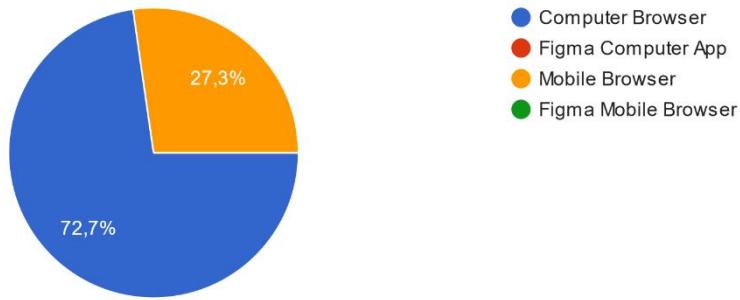


Figure 15

All of the answers were performed by fellow university students, but it was made sure that students currently enrolled in the IPC course did not take part in the evaluation, as to avoid previous knowledge of the project. Recruiting was done through social media or messaging applications.

## Method

The evaluation was conducted through Google Forms and Maze. Users were sent a form with a link to Maze and the flow of the evaluation was kept alternating between these two platforms. For each task the user would be presented with the description of the task and would be asked to perform it

via Maze and then answer a few questions in the form. In the end, a few general purpose questions were posed as a way to help profile who was evaluating.

## Tasks

The evaluation was divided in three tasks:

1. Books – Buy a book with a price between 15€ and 20€
2. Spots – “Tag Along” to an occupied seat.
3. Events – Register in the SINF event

The users would start every task at the main menu and, to facilitate the evaluation, we created different screens to help the user understand if he was performing the task correctly.



*Figure 17 – Successful registration*

*Figure 16 – Unavailable page*

## Measures

Using Maze we got an analysis for every task performed by the participants collecting the number of participants that finished each task combined with the time it took to do so, and the number of participants who started but didn't finish each task. This data was fundamental to measure the efficacy and efficiency of the tasks.

Using the Form we collected subjective information about each task. Such as, comfort with the map displayed or the filter selection. In contrast with the previous, this data was more meaningful to study the satisfaction of users with each task and the application in general.

## Results and statistical analysis

After analyzing the tester paths, we decided not to take into account the amount of “missclicks”. This decision is based on the fact that Maze is somewhat restrictive in what a “direct” or “correct” path is, and as such, users were being reported as being inaccurate with their clicks, when it was simply not true.

The results marked with “Give up” were only used to calculate the success rate of their task, as the duration of these only indicates the time it took for the participant to close Maze after starting and not the time it took them to actually achieve a meaningful goal.

It's also important to mention that we have 11 responses in the Google Forms but only 10 responses in Maze, with such a small sample this factor deeply influences our results, and will be discussed further ahead.

### Task I – Buy a book with a price between 15€ and 20€

#### Results

ID	CLIPS INSIGHTS	OUTCOME	DURATION	MISCLICKS	MISCLICK'S PAGES	TESTER'S PATH	TESTED AT
129760662	-	● Indirect	38.77s	0	0		2022/12/02 17:21
129760704	-	● Indirect	30.61s	1	1		2022/12/02 17:22
129774706	-	● Indirect	28.90s	2	2		2022/12/02 19:00
129890512	-	● Direct	17.53s	1	1		2022/12/03 16:18
129902410	-	● Indirect	21.32s	0	0		2022/12/03 19:29
131041886	-	● Direct	16.12s	0	0		2022/12/08 14:06
131033656	-	● Indirect	14.04s	0	0		2022/12/08 14:07
131041968	-	● Direct	48.33s	0	0		2022/12/08 14:08
131042796	-	● Indirect	123.42s	9	6		2022/12/08 14:10
130986209	-	● Give up	29.27s	10	5		2022/12/08 14:14

131035290	-	● Indirect	25.81s	1	1		2022/12/08 14:15
131049479	-	● Give up	62.62s	6	3		2022/12/08 14:31
131046499	-	● Direct	26.46s	0	0		2022/12/08 14:33
131190659	-	● Give up	31.56s	5	3		2022/12/08 22:03
131210188	-	● Indirect	36.48s	1	1		2022/12/09 00:20
131283115	-	● Indirect	54.59s	1	1		2022/12/09 09:44

Figure 18 – Maze results for the first task

How satisfied were you with the filter selection?

11 respostas

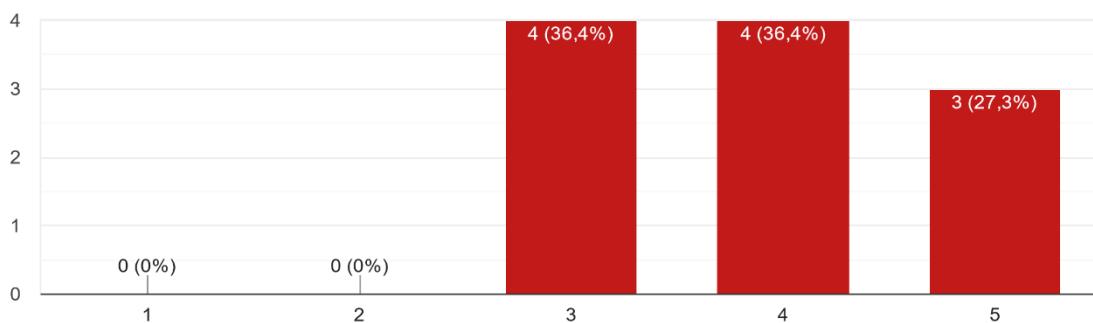


Figure 19 – Filter satisfaction

Regarding the price selection, how adequate was it (price range, ...)?

11 respostas

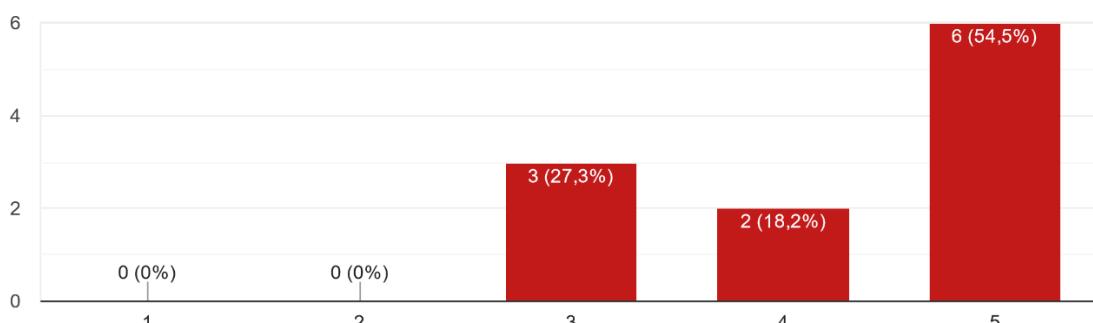


Figure 20 – Price selection satisfaction

## Usability requirements

Measure	Description
Efficacy	If the book is available, all the users should have a success rate of 96% or above
Efficiency	Average time of processing the transaction below 2 minutes
Satisfaction	90% of the users should be pleased with the filter selection

*Usability requirements adapted for this task*

## Statistical analysis

Success Rate (%)	Median Duration	Average Duration	Duration CI (95%)
81.25	28.90s	37.11s	37.11 ± 15.5s

Filter Satisfaction CI (95%)	Price Selection Satisfaction CI (95%)
3.91 ± 0.491	4.2 ± 0.57

## Comparing with the usability requirements:

### Efficacy

We had set a 96% success rate goal for this task, however we only achieved 81.25%. Yet, by analyzing the heat map and the results of other tasks, we believe that the failed attempts could be misleading, in fact, they could result from the user simply deciding that they didn't want to take the evaluation.

### Efficiency

The results were well below the 2-minute mark that we set as our target. This confidently leads us to believe that there would be enough time for a transaction to be processed after navigating the menus.

### Satisfaction

Considering a rating of 4 or above as a satisfactory experience, we were unfortunately unable to meet the requirement by 26.4%. However, the price selection solution that was developed after the feedback of the previous phase proved to be a good fit among testers, gathering a satisfaction rating that, on average, surpassed 4.

## Task II – “Tag Along” to an occupied seat

ID	CLIPS INSIGHTS	OUTCOME	DURATION	MISCLICKS	MISCLICK'S PAGES	TESTER'S PATH	TESTED AT
129760662	-	● Indirect	106.25s	7	3		2022/12/02 17:21
129760704	-	● Indirect	11.71s	1	1		2022/12/02 17:22
129774706	-	● Indirect	40.06s	4	3		2022/12/02 19:00
129890512	-	● Direct	19.76s	9	2		2022/12/03 16:18
129902410	-	● Direct	17.18s	5	3		2022/12/03 19:29
131042796	-	● Indirect	20.59s	12	4		2022/12/08 14:10
131035290	-	● Indirect	31.49s	16	3		2022/12/08 14:15
131046499	-	● Indirect	31.46s	5	3		2022/12/08 14:33
131210188	-	● Indirect	29.19s	23	5		2022/12/09 00:20
131283115	-	● Indirect	31.28s	6	2		2022/12/09 09:44

Figure 21 – Maze results for the second task

Considering the map, how comfortable did you find it?

11 respostas

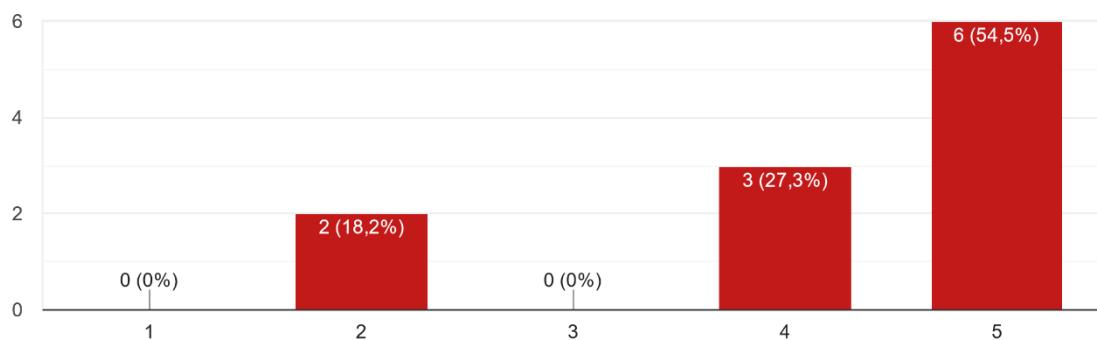


Figure 22 – Map Satisfaction

How readable where the filter, seat and description icons?

11 respostas

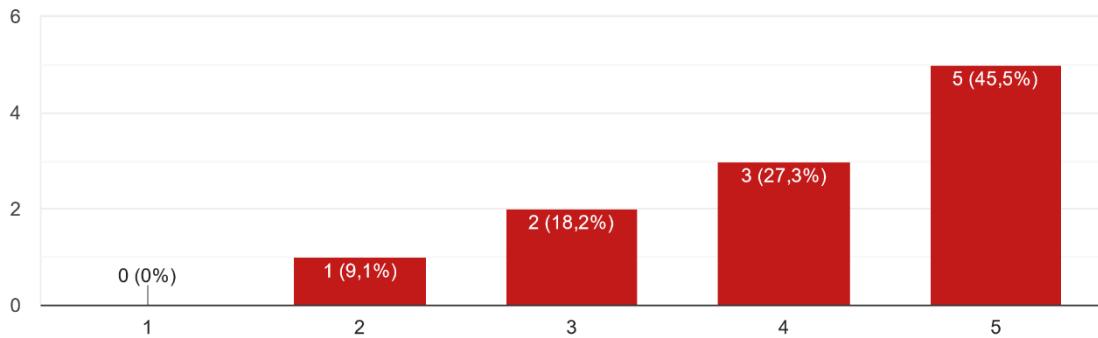


Figure 23 – Spot's Element Clarity

How expressive did you find the seat status coloring system?

11 respostas

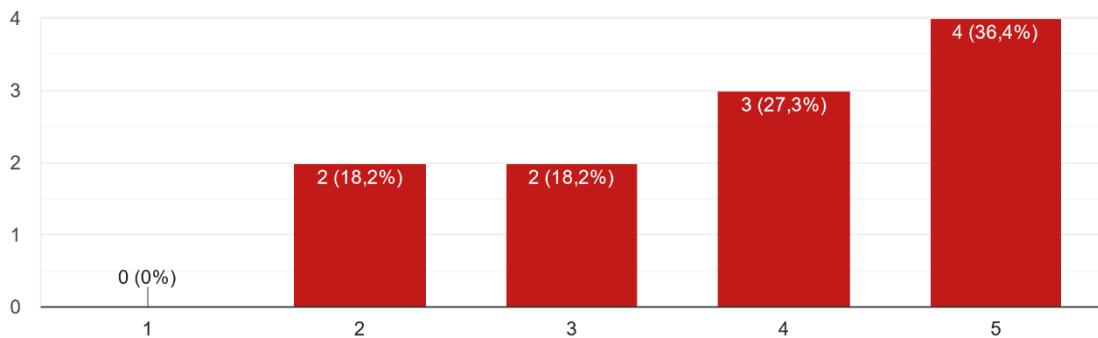


Figure 24 – Color Clarity

## Usability requirements

Measure	Description
Efficacy	80% of the users reached a valid seat in their first try
Efficiency	Average time of finding a seat with that criteria below 1 minute
Satisfaction	Less than 15% of users dissatisfied with map display

*Usability requirements adapted for this task*

## Statistical analysis

Success Rate (%)	Median Duration	Average Duration	Duration CI (95%)
100	30.235s	33.90s	33.90 ± 16.6
Map Satisfaction CI (95%)	Spot's Element Clarity CI (95%)	Color Clarity CI (95%)	
4.18 ± 0.691	4.09 ± 0.615	3.82 ± 0.691	

## Comparing with the usability requirements:

### Efficacy

Even a cursory review of the Maze click heat maps shows that participants fumbled around the map and its interface for quite a while, attempting to reach seats that, for this task in particular, were not valid, which allows us to confidently declare that we did not, in fact, hit the mark.

### Efficiency

Although the participants failed to reach a valid seat in their first try the efficiency goal was met with quite a comfortable margin, this leads us to believe that this task is easy to learn for the users and that even the faulty efficacy will surely see change after a few usages of this feature.

### Satisfaction

Unfortunately, we were unable to meet the goal of less than 15% dissatisfaction by just 3.2%. However, given the proximity to our goal and the interactive nature of the map, we are able to see that Figma might not have been best tool to implement this feature, which could contribute to the dissatisfaction of some of the participants.

### Task III – Register in the SINF event

ID	CLIPS INSIGHTS	OUTCOME	DURATION	MISCLICKS	MISCLICK'S PAGES	TESTER'S PATH	TESTED AT
129760662	-	● Direct	19.09s	0	0		2022/12/02 17:21
129760704	-	● Direct	3.02s	0	0		2022/12/02 17:22
129774706	-	● Direct	4.20s	0	0		2022/12/02 19:00
129890512	-	● Direct	2.02s	0	0		2022/12/03 16:18
129902410	-	● Indirect	6.11s	0	0		2022/12/03 19:29
131042796	-	● Direct	9.16s	0	0		2022/12/08 14:10
131035290	-	● Direct	2.99s	0	0		2022/12/08 14:15
131046499	-	● Direct	3.04s	0	0		2022/12/08 14:33
131210188	-	● Direct	6.21s	1	1		2022/12/09 00:20
131283115	-	● Direct	2.86s	0	0		2022/12/09 09:44

Figure 25 – Maze results for the third task

Did you access the event by the slider on the main menu or by the event page?  
11 respostas

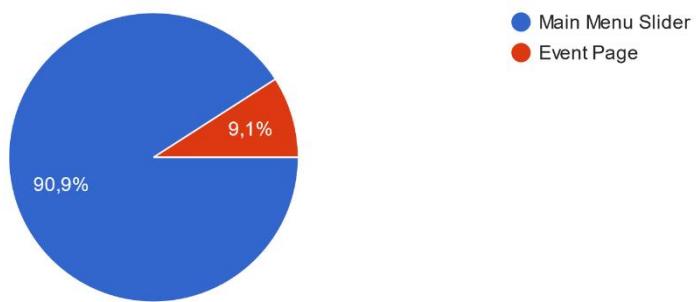


Figure 26 – Task 3 Flow

## Usability requirements

Measure	Description
Efficacy	The registration process has to be completed within 3 tries
Efficiency	The searching process should be possible to do with 6 or less clicks
Satisfaction	95% of the users should consider the registration process to be practical

*Usability requirements adapted for this task*

## Statistical analysis

Success Rate (%)	Median Duration	Average Duration	Duration CI (95%)
100	3.62s	5.87 s	5.87 ± 3.18

## Comparing with the usability requirements:

During the initial user analysis, it was made clear that this was clearly the domain with less interest for the users. With this in mind, and since we didn't get any feedback during the heuristic evaluation regarding it, we decided to use this task to evaluate the more general flow of the application.

In fact, this task was particularly simple, as so, we used it to figure out if the users would access the event page directly from the slider in main menu or if they would choose to go through the event page. With 90,9% of users using the main menu slider, we are able to report that the flow is as expected. It is also relevant to point out that we comfortably reached the efficacy, efficiency, and satisfaction requirements.

## Conclusion

Analyzing the results from this last phase, we quickly came to the conclusion that there should've been a "playground" like moment before the start of the Maze evaluation, where the user could move freely through the whole application and explore all the features. In fact, the first task heat map shows that some users started by exploring different menus and only afterwards attempted to tackle the task itself.

Another important factor that we must keep in mind is the dimension of our sample. Unfortunately, we could only gather 10 responses which puts in cause the reliability of our results. Furthermore, the different amount of answers in the form and completions of the Maze do not inspire much confidence in some of the conclusions we would like to take away from them. This discrepancy was also unrepairable as it is not possible to accurately identify which of the form's answers was faulty. We believe that this "extra" user might not have correctly terminated the Maze evaluation, meaning their data would not have been registered, and unknowingly finished the Google Forms.

With this being said, we are proud of the developed work and, from talking with the participants during and after the realization of this evaluation, we were able to develop an elegant and enjoyable prototype that shows a solid beginning to a larger product. In addition, we are also glad that, throughout this whole project we were given the opportunity to explore a bit of the UI and UX worlds, and we are now able to possibly apply some of the learned concepts, methods and processes in future projects.

## Annexes

### Phase 1

Gender

17 respostas

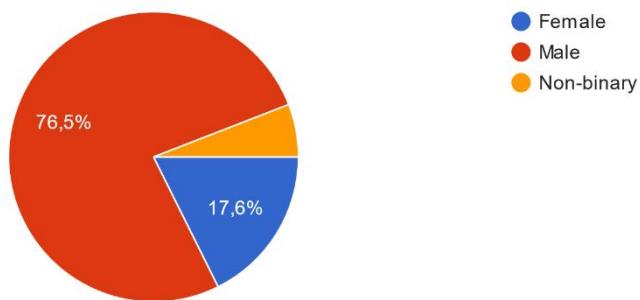


Figure 27

Age

17 respostas

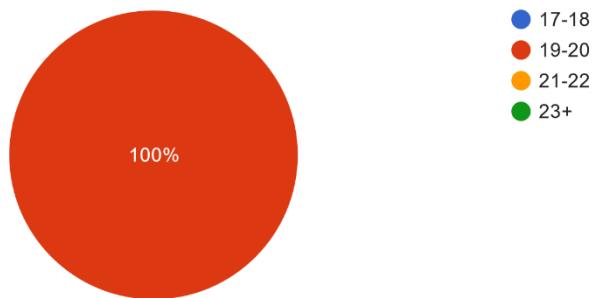


Figure 28

Currently attending year

17 respostas

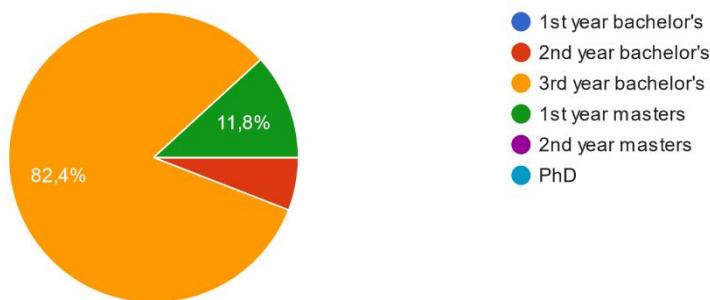
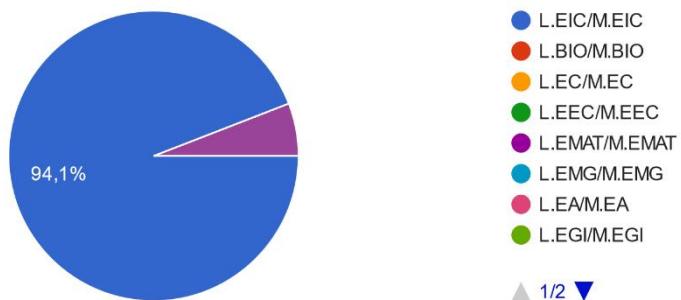


Figure 29

Course

17 respostas



▲ 1/2 ▼

Figure 30

How often do you use the library?

17 respostas

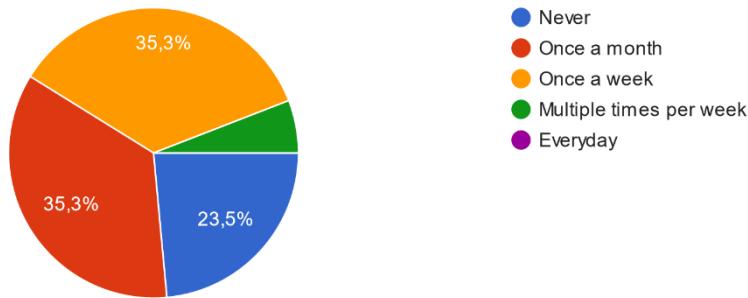


Figure 31

What do you usually do in the library?

14 respostas

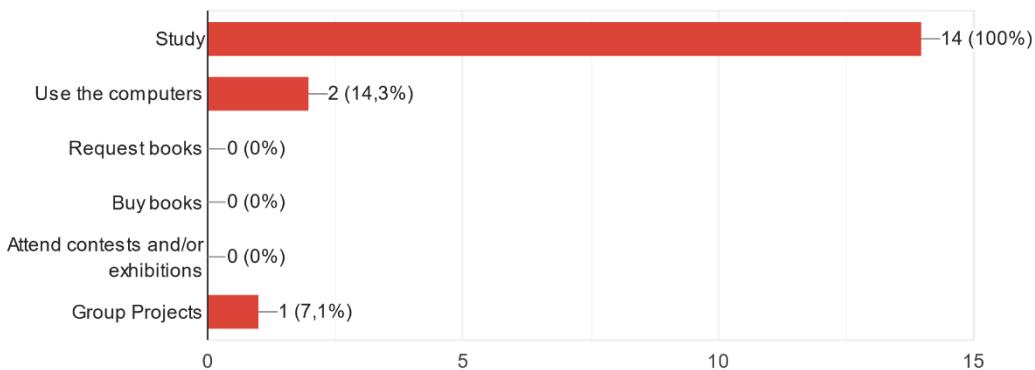


Figure 32

Do you think these services are easily accessible?

15 respostas

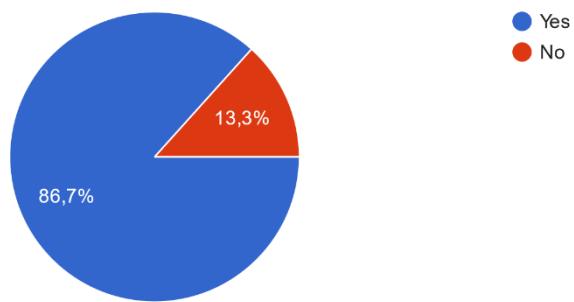


Figure 33

Do you usually attend events that take place in the library?

17 respostas

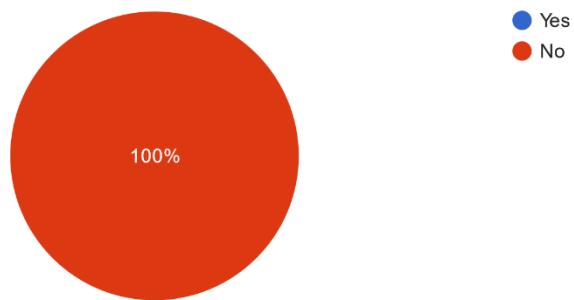


Figure 34

If not, what are the main reasons?

17 respostas

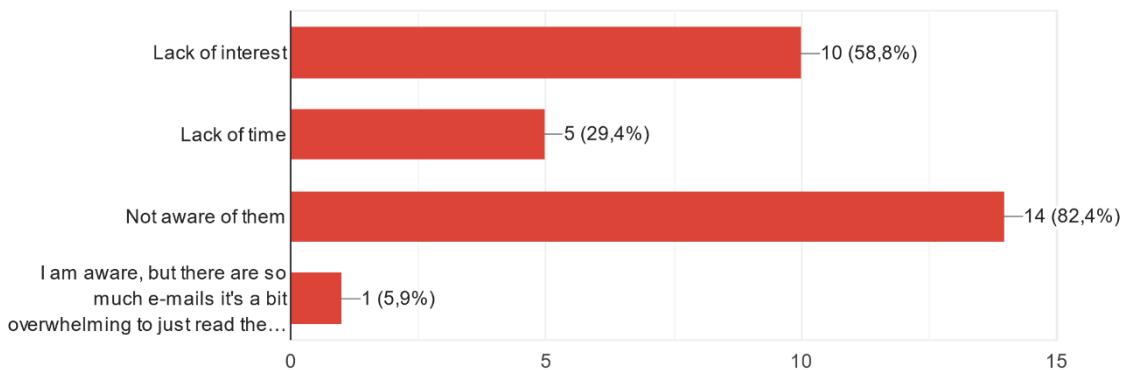


Figure 35

How often do you read/consult the mandatory literature demanded by the units you take?

17 respostas

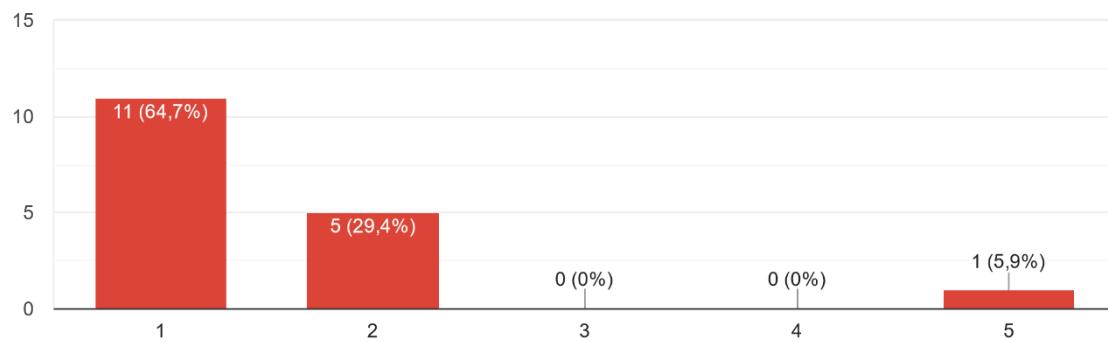


Figure 36

If not, what are the main reasons to not read them?

16 respostas

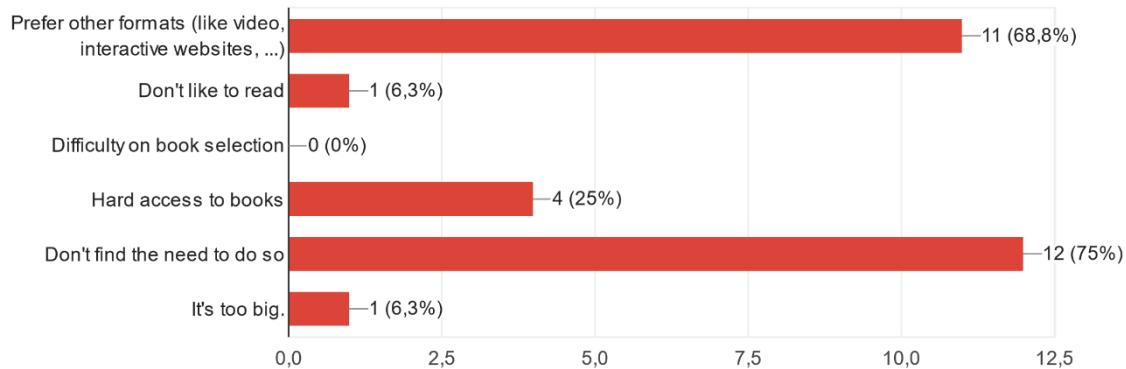


Figure 37

How would you rate your experience with the following information platforms (Rate those you've used before)

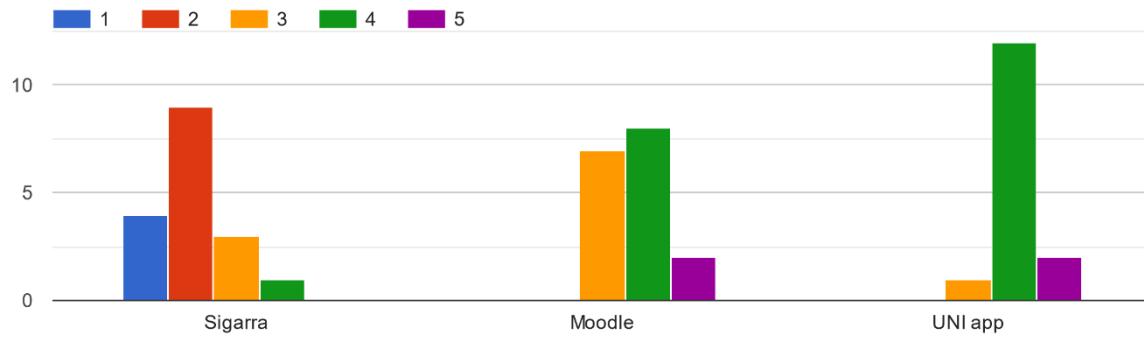


Figure 38

Are you familiar with FEUP's library website?

17 respostas

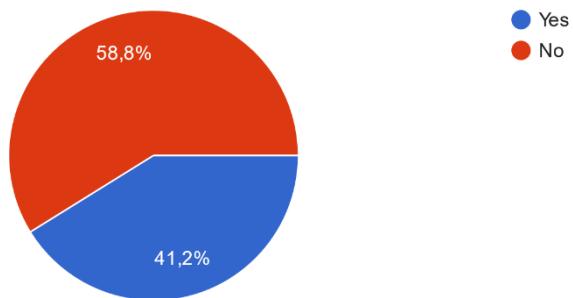


Figure 39

If so how would you rate your overall experience with it?

7 respostas

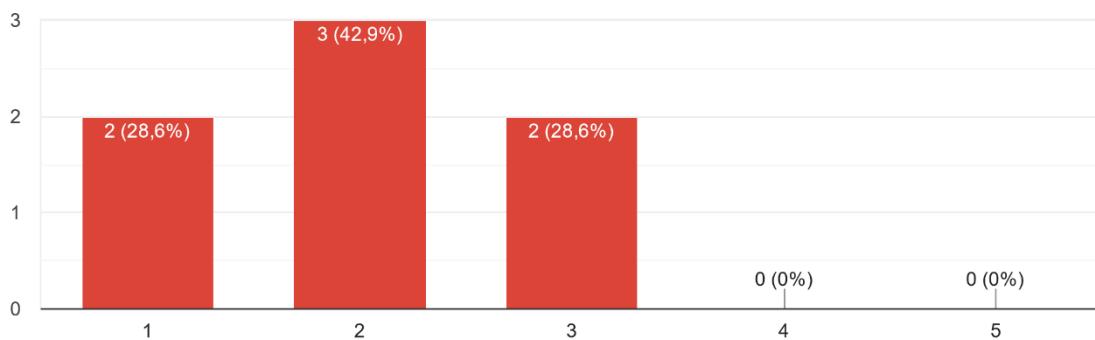


Figure 40

Please rate this library related information, according to its relevance.

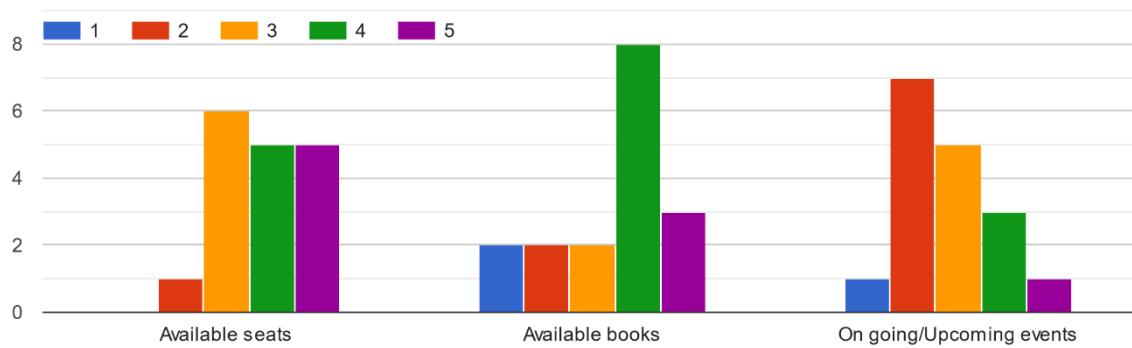


Figure 41

Which payment method do you tend to use in your daily transactions?

17 respostas

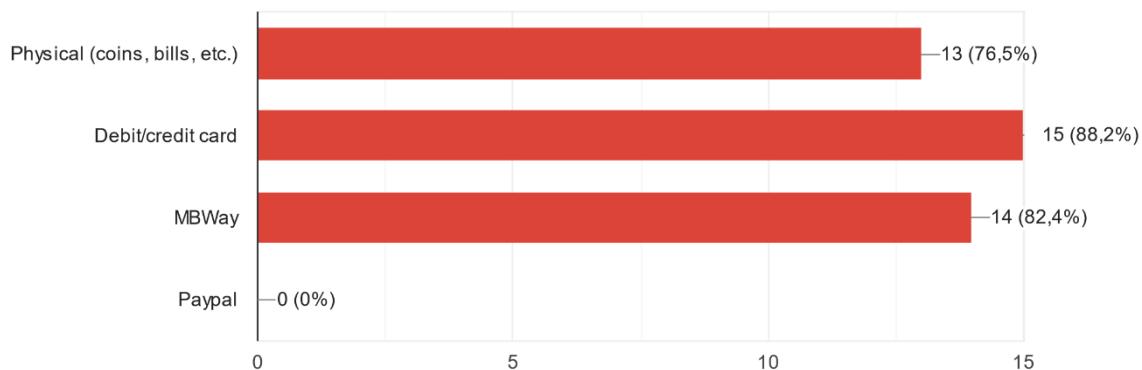


Figure 42

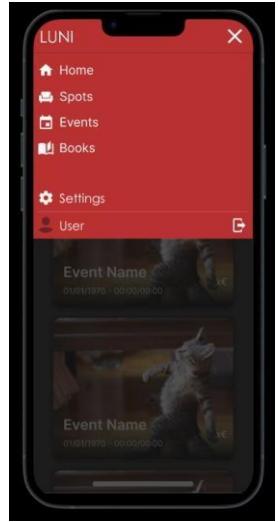
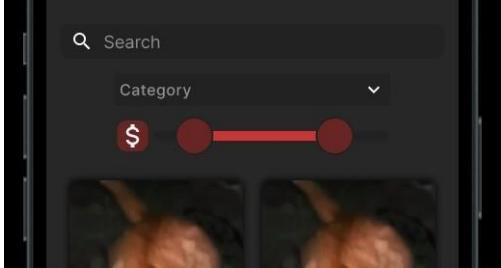
Do you have any comments regarding the functionalities discussed or others you'd like to see implemented?

0 respostas

Ainda não existem respostas a esta pergunta.

Figure 43

## Phase 2

Problem #	Issue	Heuristic(s)	Severity (1-4)
1	Does not have a help page. 	10	1
2	The use of a slider without values for expressing a price range does not communicate to the user the exact values of said price range. 	1	3
3	Inconsistency between color used and meaning of "limited availability" in floor status (yellow) and seat status (blue).	4	2

4	<p>The icons for the seat specification could be more explicit by putting, for example, a “X” on top of the icon. Then, the chosen option could be highlighted.</p>	4	1
5	<p>When registering for an event or ordering a book, there is not a message saying if the action was made successfully or unsuccessfully.</p>	1	2

Heuristic Evaluation Report Group 07

<b>Problem #</b>	<b>Issue (include screenshot)</b>	<b>Heuristic(s)</b>	<b>Severity (1-4)</b>
1	Adicionar botão para voltar à página anterior	1	
2	Ícones para filtros não têm funcionalidade evidente	3	1
3	Não há botão para ajuda	10	1
4	Não há documentação	10	1
5	A barra de preço do livro podia ter indicador em número	1	1
6	Separação entre upcoming events	1	2

Heuristic Evaluation Report Group 02