Share Portugal

Participatory Platform

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Abstract

Nowadays, technology impacts almost every economic activity, and tourism is a major sector which emerges from mobility as a form of capital. In more and more countries, tourism is becoming one of the most important sources of revenue, which in return becomes also one of the larger investment areas. Furthermore, more and more people are not just interested in visiting new places and getting to know new cultures. Travelers place a greater emphasis on having new experiences, feeling that they are an important part of their destination, and on having very close and authentic contact with their hosts. Based on these two ideas, we have designed and deployed the Share Portugal platform, aiming at harnessing the participatory potential and the crowdsourcing power of web technologies. The fundamental and base concept of Share Portugal is based on allowing local inhabitants of a specific location to share their profiles and preferences about what activities to do and which sightseeings to spot in such location, while visitors can rely on authentic and reliable information provided by locals, and even use the platform to initiate dialogues with them and deepen their relationship.

Keywords

Tourism, Participatory Platforms, Crowdsourcing, Share Portugal, Usability
Resumo

Atualmente, a tecnologia tem um grande impacto em quase todas as atividades econômicas, sendo o turismo um setor importante nesta área e que cada vez mais faz da mobilidade uma forma de capital. Em cada vez mais países, o turismo está-se a tornar uma das maiores fontes de receita e consequentemente uma das maiores áreas de investimento. Para além disto, atualmente, as pessoas não estão apenas interessadas em visitar novos lugares e conhecer novas culturas. Os turistas dão cada vez mais ênfase em ter novas experiências, sentir que são uma parte importante do destino a ser visitado e ter um contato muito próximo e autêntico com seus anfitriões. Com base nestas duas ideias, desenvolvemos a plataforma Share Portugal, com o objetivo de aproveitar o potencial participativo e o poder do crowdsourcing das tecnologias web. O conceito base da aplicação Share Portugal é permitir que os habitantes de um local específico partilhem as suas preferências sobre que atividades fazer e quais os pontos turísticos que devem ser visitados nas suas terras, enquanto os visitantes podem confiar em informações autênticas e confiáveis fornecidas pelos "locais", e até mesmo usar a plataforma para iniciar diálogos com eles, aprofundando o relacionamento entre ambos.

Palavras Chave

Turismo, Plataforma Participativa, Crowdsourcing, Share Portugal, Usabilidade
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Introduction

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At a time when tourism is growing at a steady pace, and with an increasing impact on the development of countries, it is crucial to recognise and adapt to the main trends and transformation problems that will affect the sector in the short, medium and long term.

If traveling was formerly considered a luxury that only a few could enjoy, nowadays it is a possibility within the reach of many more people. Just recently Tourism was booming in and Portugal, thanks to the rise of low-cost airlines and flights and lodging websites and platforms. Coupled with all this, it is clear that tourists of the XXI century are way more connected to the world than any previous generation. Travel is cheaper and simpler thanks to the much easier access to technology and websites and platforms like Airbnb\(^1\) or Skyscanner\(^2\), which are changing the way travel is planned and executed. People nowadays are confident and capable enough to book and plan a trip by themselves, rather than paying a travel agent to do it. They are also proactive, in the sense that they are constantly looking, comparing and planning different and cheaper ways of what to do, eat and see while abroad.

In fact, today’s travellers are increasingly looking for great experiences, whether it’s an authentic local experience, an adventure or even an opportunity to make a difference in the destination. Over the next five to ten years, this group will become the industry’s main customer base\(^3\). As such, it is proven that creating a strong value proposition for this group will be key to attracting them in the next decade.

Along with all this, the notion of Smart Travel has to be increasingly present in this industry to create a safe and perfect experience for tourists. With the use of technology, travellers seek not only convenience, but mainly new experiences and personalised services to themselves.

**Technology and Tourism**

Nowadays, technology impacts almost every economic activity, and tourism is a major sector affected by this trend. The rise of the tourism industry emerges from mobility as a form of capital. In more and more countries, tourism is becoming one of prime sources of revenue, which in return becomes also one of the larger investment areas. As stated before, this is mainly thanks to broader access to technology — we actively use websites and smartphones to buy plane tickets, locate points of interest or even evaluate restaurants and services.

Furthermore, more and more people are not just interested in visiting new places and getting to know new cultures. Travellers place a greater emphasis on having unique and real experiences, feeling that such experiences are an important part of their visit to the travel destination. Travellers desire having very close and authentic contact with their hosts. But how can technology play a role in this connection between tourists, places and hosts?

2. https://www.skyscanner.pt
Contemporary technologies exploit participation and crowdsourcing mechanisms to create participatory and crowdsourcing platforms that somehow address the above issues.

Participatory platforms can be defined as forums created to source, analyse, visualize and share information, expertise, and solutions to advance social causes and/or solve social and policy problems. These platforms not only address some traditional concerns about civic engagement — such as lowering the barriers for citizen engagement — but have also promoted a wave of innovation around how citizens tackle local challenges and realize opportunities collectively [2]. Successful examples of these technologies applied to the tourism sectors are Spotted by Local⁴, Vayable⁵ or Há-Vita⁶ [3].

As for Crowdsourcing, the term has been used to describe the process of getting work or funding from a large group of people in an online setting. The basic concept behind crowdsourcing is using a large group of people for their skills, ideas and participation to generate content or facilitate the creation of content or products⁷. In the tourism area crowdsourcing has been used for various purposes. On one hand, for allowing locals to promote their activities and share their knowledge, and on the other, to enable tourists to contribute with content, questions and opinions about their experiences. Successful examples are Wikipedia⁸, Airbnb⁹ or Zomato¹⁰.

Based on these research case and industry cases studies we ideated, designed and deployed the Share Portugal platform, aiming at harnessing the participatory potential and the crowdsourcing power of web technologies. The fundamental and base concept of Share Portugal is based on allowing local inhabitants of a specific location to share their profiles and preferences about what activities to do, and which sightseeings to spot in such location. Visitors can rely on authentic information provided by locals, and even use the platform to initiate dialogues with them and deepen their relationship.

1.1 Goals

The main objective of this work is to create a participative platform that:

- Close the gap between travellers and locals, allowing a closer relationship between both, that grants a trusted ‘mentor’ to those who are exploring the location for the first time

- Provide a new channel for tourists to gain new and interesting experiences in the cities they are visiting, making them feel they have an important role in the city

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⁴http://www.spottedbylocals.com/
⁵https://www.vayable.com/
⁶https://havita.m-iti.org/
⁷https://en.wikipedia.org/wiki/Crowdsourcing
⁸https://www.wikipedia.org/
⁹https://www.airbnb.pt/
¹⁰https://www.zomato.com
• Allow hosts to present their own city and its activities, gastronomy and culture to travellers, while making themselves and their personality known as inhabitants of the place in question

• Meets all the previous points in an immersive and interactive way, provoking some kind of emotion for both locals and travellers, while assuring a great and memorable experience to both

1.2 Document Structure

The process of designing and developing the platform evolved through several stages, following a research by design approach [4], where users are involved in validating ideas and prototypes until the reaching of the final and satisfactory stage. Therefore, we present in Section 2 we present the results of the research process describing some of the literature related to this thesis context followed by its discussion. Then in Section 3, the detailed description of the implementation process is reported. The evaluation process is available in Section 4 including all the results and conclusions from Usability Tests performed to validate our work. The document ends up with the main conclusions regarding all the work done, the results achieved and suggestions for future research, in Section 5.
2 Related Work

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Many inquiries have been conducted on facilitating the life of tourists during their travels, as well as providing them with new experiences in conjunction with local people. The challenge and focus of this thesis project is to build a platform to support a direct way to create empathy and emotions between these two communities.

In this section, we present the results of the research done on Crowdsourcing applied to tourism. Later, the section presents the literature related to the relationship between Tourists and Locals.

To finish this section, we present several important projects that exist in our case study, drawing conclusions with a table on the positive and negative aspects of each platform, followed by a discussion about the most and less compelling aspects emerging from these applications and that are relevant for our work.

## 2.1 Crowdsourcing In Tourism

When we talk about Crowdsourcing, we refer to an online community where members participate for a wide range of purposes including fun, enjoyment, and amusement [5, 6]. In this way members can build relationships with others without geographical restrictions. Digital technologies already impact the tourism sector and in particular the concept of Crowdsourcing or sharing is benefiting immensely the tourism industry. Digital tools and online travel communities can play a role in bridging the gap between locals and tourists [6, 7].

Compared to traditional tourism, this type of tourism involves a special kind of consumption known as emotional tourism [8]. We refer to Emotional Tourism when the travel experiences are not strictly limited to sensory touchable items but provide various emotions linked to the closeness achieved with another human being. Despite the ritual of visiting must-see sights and tourist attractions, this kind of tourist consider their mode of travel as an experience of learning and self-discovery [9, 10].

The mission of Crowdsourcing, in the field of tourism, is connect people and places, to create educational values about the importance of the places visited, to increase collective awareness, to spread tolerance and to facilitate cultural understanding. Consequently, its meaning allows its practitioners to share experiences, origins and values, either on the side of tourists who are more likely to, for example, visit attractions and places not listed on conventional tourist maps in their search for new experiences, or on the side of the locals that make their land known while also making tourists aware of the importance of responsible tourism.

By analyzing Crowdsourcing on the tourism topic from another perspective, conclusions can be drawn about the parties involved and their behaviors.

Based on their qualitative research, Steylaerts and O'Dubhghaill, found that this phenomenon could overcome guests’ trite sentimentality and inhibit the individualization of each guest's experience, which
represents another central tenet of tourism Crowdsourcing that supports its popularity [11]. Earlier, Bialski’s, empirical research on tourism Crowdsourcing, relied on the experiences of several tourism crowdsourcers to explore the new social relations generated in the context of an exchange-based, co-creating hospitality and tourism experience. Molz, developing Bialski’s observation that social transformations are possible through the individual crowdsourcers experiences of personal growth, argued that tourism crowdsourcing constituted social activism [12].

Pultar and Raubal also understand that whereas traditional travel guides are static, location based social networks quickly allow their members to access dynamic information about destinations attractions or events [13]. Bialski’s analysis outlined the process by which two strangers can become close in a given destination, while Zuev also explored how tourism Crowdsourcing changes users’ perceptions of space and both physical and cultural borders through a computer-mediated hospitality regime [14].

The results, based on qualitative and interpretive data, indicated that tourism Crowdsourcing hospitality space is indeed shaped by the strangers’, hosts’ and guests’ reciprocal adjustment to each other’s daily rhythms, and their sharing of spatial knowledge with strangers.

Thus, we can conclude that Crowdsourcing in a tourism context can function as social activism by influencing the way tourists receive information about the place they are visiting, in the way they do tourism and in shaping the attitudes of both parties, thus making the experience interesting for both.

2.2 Relationship Between Tourist and Local

In 1977 Smith argued that tourism generally accompanies contacts between hosts and guests, and thus the interactions between the parties may result in some issues, including economic or cultural differences between hosts and guests [15, 16]. Since the introduction of the hosts-guests association, the literature has focused on the relationship between tourists and locals, the impact of tourism on local communities, and residents’ attitudes toward tourism development [17].

However, the role of online communication technologies in bringing geographically dispersed social networks together has rarely been discussed. This gap should be bridged because information technologies are progressively important in the relationships between local communities and tourists.

Online travel communities play the important role of connecting tourists and locals and suggest that further research is required in order to explain the types and characteristics of online networks of locals and tourists [7]. More and more studies indicate that local residents play important roles in providing destination information to travellers online and are influential in recommending accommodations and restaurants to online travel community members. On the other hand, experienced travellers are more influential in providing general destination information [17].
2.3 Role of Tourist and Local

An important part of a tourist’s landscape are the activities of locals. In this sense, locals’ everyday ‘work’ in tourism as their mundane practices and routines become a central part of the experiential landscape for tourism. The role of locals in touristic places is not transparent to the locals themselves because they can be quite unaware of their role as part of the tourist place and of their performance of a particular cultural system. Thus, locals are, in first, performers of ‘authentic’ practices that tourists come to consume [18].

Tourists also interact with networks of local people, from those specifically involved in delivering tourist services to the more fleeting interactions with locals whose everyday lives are regularly lived in the locations the tourists are visiting. On the other hand, locals interact with tourists, by either being directly involved in the tourism industry, or by simply meeting them. In doing so, locals become (usually consciously) enrolled as peripheral commodities or cultural subjects that provide the human-cultural furniture of a place. Tourists’ place-making is driven by interactions with the locale and with locals during the course of the tourist’s visit, and this is done through the mechanism of networking [19].

While tourists exist effectively and necessarily on the outside of local practices, tourism also thrives on a fantasy of ‘becoming local’ or of revealing some authentic quality of a place that originates in local, un-staged practices [20]. Such meetings occur in what Bruner terms the tourist ‘borderzone’ – the hectic, transitional and dynamic zone of interactions between insiders and outsiders [21]. Bruner argues that this zone is a place of creative negotiations, where identities such as the uninformed visitor and the skilled, knowledgeable local are continuously made and unmade. The meeting can be a vehicle for reflective identifications on the part of the local community, those who are looked upon. However, the visiting tourist is not a powerless subject. The tourist can discover or unearth the local, retaining the power to define what is worthy to gaze upon or with which to interact.

While tourists do not gain membership of local communities, since their time ‘being there’ is so short and since interaction opportunities are often constrained, a number of intense, usually brief, instances of engagement do take place.

These feed into tourist fantasies of local cultures, of becoming local, and on actual engagements or meetings, and play a critical role in the tourists’ making of place.

2.4 Participatory Platforms

Participatory Platforms represent the new wave of mechanisms that enable citizens to engage in local issues in more ways than before. This changing nature of civic engagement positions public administration and urban planning researchers to focus on these newly emerging technology - enabled
participatory platforms. In the following subsections we will look at several relevant Participatory Platforms.

2.4.1 Há-Vita

In order to contextualize the research project, we will describe Há-Vita [3], a web platform that is designed to enrich the tourists’ knowledge about local heritage while encouraging and supporting contact with the locals. The interactive platform functions as a touch point designed to open dialogues between visitors and tourists of the island of Madeira and its rich natural capital, traditions and folklore.

![Há-Vita website screenshot](image)

**Figure 2.1:** Screenshot of portion of the Há-Vita website

To create opportunities for this dialogue, the platform functions as a repository of locally collected video interviews highlighting many aspects of Madeiran islands’ natural capital and local culture, divided by seven themes, inspired by the topics collected during the interviews with the locals:

1. Laurisilva (medicinal and endemic plants)
2. Madeira’s fauna (endemic birds)
3. Traditional Products
4. Hydrological Balance (of Laurisilva)
5. Macaronesian Forests
6. Invasive Species
7. Natural Disasters

[https://havita.m-it.org/](https://havita.m-it.org/)
In all interviews the interviewees were chosen according to their expertise and local knowledge on those themes.

The platform was design in a way so that viewers, if they so choose, can connect directly with the interviewees as shown in Fig. 2.2 - Connect with the local. This possible connection may assume different formats depending on the interviewee’s preferences. For example, Raimundo Quintal, Natural Disasters expert, is responsible for organizing several activities of reforestation. Viewers of the website can connect with him through his preferred communication medium. The Há-Vita website was created to be an interactive link between the expert (Raimundo Quintal) and the audience. In this way, the viewer of the website can possibly enroll in one of Raimundo’s activities and make a difference by participating in planting trees in Madeira’s mountains. This participatory approach enabled by the Há-Vita website offers the tourist the contact point to embark into experiences that are directly related with to content that they are viewing allowing the discovery of new aspects of Madeira’s natural and cultural Heritage.

*Wildfires and Floods: Two Sides of the Same Coin*

**Natural Disasters**

*Figure 2.2:* Há-Vita design allows connect directly with the interviewees (feature in development)
On the other hand, tourists are also invited to send questions, comments or stories to the Há-Vita platform, in order to narrow the gap between places and tourists as much as possible. In fact three levels of engagement are encouraged (depicted by three levels of green in the interface illustrated in Fig. 2.3). The three level encompass:

1. Sharing personal stories or anecdotes regarding the island itself

2. Referring the Há-Vita portal editors about a local person who holds knowledge about the island and is interested in participating, so the editors can arrange an interview with the person and the material to the Há-Vita site

3. Share opinions and feedback about the website itself

**Figure 2.3:** Screenshot of the portion of the website where tourists can participate and send questions, comments or stories
2.4.2 Loqal

Loqal\(^3\) is a mobile App that enables the user to ask questions about a place to local people. In this way, it is possible to obtain customized responses directly on the app, with the best answer being highlighted. The system entails a feedback mechanism and allows for the exploration of other users’ questions related to a specific place in order to see if an answer is possible.

![Loqal App](image)

**Figure 2.4: Loqal App**

**Main features:**

- Possibility to ask questions about a place adding photos and other elements
- Receive customized responses by locals with the best answer highlighted
- Explore other users’ questions for a specific location and find an answer to them

2.4.3 SnapCity

SnapCity\(^2\) is a mobile App and a meeting point where people that visit a city can connect with the user through a chat platform and enjoy insider’s knowledge and experience the real city, off the beaten track. When visitors have a question they will ask it on the platform. If a user thinks they can provide a
good answer, chat request can then be accepted, and let the connection begins. At the end, visitors are encouraged to tip the Locals, to thank them for their time and support.

![SnapCity App](image)

**Figure 2.5: SnapCity App**

**Main features:**

- Possibility to chat with locals and ask about restaurants, points of interest or secret spots
- Receive customized responses by locals
- Locals can receive money by the time they spend helping visitors

### 2.4.4 Vayable

Vayable⁴ is a platform that offers the possibility to buy an "insider guide" for different destinations, or to book an experience offered by local people (with the payment of a fee). The purpose of the experience is to provide visitors with cultural enrichment, education and a good time. Experiences can be related to

⁴[https://www.vayable.com/](https://www.vayable.com/)
art, fashion, design, eating, drinking, architecture, history, outdoors or any other cultural experience that tells a unique story about the destination.

![Figure 2.6: Vayable Website](image)

**Main features:**

- Book a local guide
- Book an experience with local people
- See profiles of locals, with their experience, activities and the type of experiences they can offer to travellers
- Locals can receive money by the time they spend helping visitors

### 2.4.5 Cool Cousin

Cool Cousin\(^5\) is a web platform and a mobile app that helps tourists receive recommendations from locals ("cousins") in different cities. Throughout the platform, users can learn more about the local inhabitants, called cousins, discover their recommendations for a specific city and ask them questions.

\(^5\)https://www.coolcousin.com/
Main features:

- List of recommendations from the cousins for a specific city
- Possibility to message a local for personalized advice and recommendations
- Profile pages of cousins for better matching people

2.4.6 Local Travel Movement

Local Travel Movement<sup>6</sup> is a web platform that aims connecting independent travellers with local people. Local travellers share the same values: not only do they want to connect with locals, but also to travel in a manner that is aware of the local environment, to respect the local heritage and culture and spend money locally. Through this platform, users can connect with other like-minded people and organizations, to share and discover ideas, news and developments regarding the Local Travel movements.

<sup>6</sup>http://www.localtravelmovement.com/
Main features:

- Blog with information for traveling locally
- Possibility to comment on blog’s posts and start a discussion
- Search engine or proposed categories (e.g. local food, local accommodation) for browsing the platform

2.4.7 Spotted by Locals

Spotted by Locals\(^7\) is a mobile app and a web platform that allow to find recommendations and information about different cities written by local people. They can be related to different topic (art and culture, coffee and tea, relaxing, theaters, shopping) and in the mobile app can also be browsed via an interactive map.

\(^7\)http://www.spottedbylocals.com/
Main features:

- Search for recommendations and information about a city written from a local
- Search for category or through a search engine
- Possibility to learn more about the people that wrote articles (spotters)
- In the app version possibility to browse the tips via an interactive app
- Locals receive money by the time they spend helping visitors

2.4.8 Urban Buddy

Urban Buddy® is an App that helps travellers exploring the cities better with the help of residents, in real time. The idea is tourists ask questions in the application and in a short time a local provide a response in a chat.
Main features:

- Possibility to chat with locals
- Receive customized responses by locals
- Hosts have several types of relevance and priority to answer questions

2.5 Summary of Tourism Communication Platforms

In this section, we have reviewed some important concepts for the study of our project as well as some platforms that can be of inspiration for designing our project.

The related work section (Chapter 2) started by analysing some theoretical concepts about tourism-related Crowsourcing in order to have a wider spectrum of knowledge at the time of analyzing the features of the practical research and business oriented applications that were explored in the above sections.

In order to better define our goal, we analyzed several applications that relate to the question to be addressed to better understand their strengths, weaknesses and to identify the niche we aim to fulfil. In Fig. 2.11 we have an overview of all the platforms and websites we have analyzed. By analyzing the
various platforms, a series of characteristics emerged as being common among them. Not all of the platforms incorporate all of the characteristics, but somehow are the five important features for connecting tourists with locals emerged from the analysis of the revised platforms. In Fig. 2.11, we pointed out the characteristics that each platforms holds in comparison with the others. Below we describe in details the five identified features.

(a) Direct chat between participants
(b) Questions and Comments (in blog style)
(c) Questions and comments organized by subject
(d) Possibility to direct the question to a certain participant based on their profile
(e) User is rewarded for the time spent in participating

Regarding “direct chat between participants” we are referring to the possibility for a tourist to exchange messages directly with a local. In “questions and comments in a blog style” we are discussing the possibility of participating a platform where all users can see the interactions that have been posted up to the present. “Questions and comments organized by topic” refers to giving the possibility for the tourist and the host to be inserted in certain topics by their interests, that is, the local can, for example, wish to participate only in matters related to birds and not with architecture. On the other hand, we also address the possibility that the tourist may want to interact only with participants who have personal tastes, hobbies or other profile issues, similar to his and, thus, be advised according to their preferences. To conclude the features that have been examined, we have the possibility, for example, of the host being rewarded - whether in cash or in other goods - for the time spent helping the tourist in order to maintain their motivation to participate.

<table>
<thead>
<tr>
<th>Studied Approaches</th>
<th>(a)</th>
<th>(b)</th>
<th>(c)</th>
<th>(d)</th>
<th>(e)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Há-Vita</td>
<td>✓</td>
<td>X</td>
<td>✓</td>
<td>✓</td>
<td>X</td>
</tr>
<tr>
<td>Local</td>
<td>X</td>
<td>✓</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>SnapCity</td>
<td>✓</td>
<td>X</td>
<td>X</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Vayable</td>
<td>✓</td>
<td>X</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Cool Cousin</td>
<td>✓</td>
<td>✓</td>
<td>X</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Local Travel Movement</td>
<td>X</td>
<td>✓</td>
<td>✓</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Spotted by Locals</td>
<td>X</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Urban Buddy</td>
<td>✓</td>
<td>X</td>
<td>✓</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

*Figure 2.11: Platforms studied and their characteristics*

By analyzing the table above, we can see that no platform provides either all or the same set of features - each one has their own focus, with its own set of functionalities, targeted at creating a better
experience for the user.

Although all of these features have the same end purpose - to facilitate the communication between users of these platforms -, having all of them wouldn’t make sense, because it could cause a somewhat redundant experience. Instead, each platform focuses on a specific combination, according to their users’ needs.

In the ambit of the development of Share Portugal, we have studied and analyzed in detail the presented features, to find out if their implementation could improve the experience of our users. To do this, we implemented each feature on our platform and tested the performance by conducting user tests. Users gave us feedback, which we then analyzed, changed the feature accordingly, and then redo more user testing.

We concluded that users found the possibility to address the questions of tourists through their profile a huge plus on their experience, as it allows a more intimate and personal connection between tourists and hosts, in a way that both entities can enjoy the experience.
Share Portugal System

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Web platforms have a growing impact on economic activities, such as tourism, which emerge from mobility as a form of capital. However, it is not always possible to shorten the distance between tourists and locals and establish points of dialogue that will bring benefits to both parties. Thus, we proposed to develop a new participatory platform that solves some of these issues.

In order to fulfil our goals, we created a platform where hosts present themselves through a visualisation of their household (a room inside their house), in which they can personalize both the room’s look and certain personal items inside it, according to their own taste and preferences. This living room displays some of the resident's interests and activities personalised by them, with the aim of providing tourists some local information about their city.

When tourists enter the Share Portugal platform they are presented with a 2D visualisation of the city, with several of its iconic buildings that present clickable windows which in turn will lead them to enter the locals’ living room (of the registered hosts). Through this, tourists are invited to navigate the buildings of the street presented in 2D, exploring all living rooms in search for one (or many) that may spark their interest and motivate them to explore the real city. For example, if the tourist is passionate about photography and the host’s living room is decorated to convey an interest in photography, the tourist will probably have a greater affinity to activities presented by this host.

In fact, besides being able to create and promote activities in the city, hosts can personalize their rooms according to their own interests, in order to better illustrate their personality and highlight elements of their lives that can suggest possible affinities with visitors. In addition, the tourist can also contact the hosts via email and, eventually, participate in activities that they are proposing, such as going to a concert together, meet in a bar or join a workshops, for instance. In this section we will explain in greater detail the requirements that we want to implement, as well as the whole process of development until we reach the final solution.

3.1 Requirements

This work began with previous context research, aiming at understanding what had already been done in the field of participatory platforms and Crowdsourcing applied to tourism, and to realize where our window of opportunity would be to take a different approach from what had been made so far. Taking into account the related work presented in chapter 2 we identified several initial concrete requirements that we expect our solution to tackle:

**Bringing Tourists Closer to Locals**

From literature, the first identified trend in tourism is that visitors to new cities are becoming more interested in the people who live there, in their routines, habits and culture, rather than just visiting the
most touristic places or experiencing the standard the sight seeings tours that cities have to offer. An opportunity for the Share Portugal platform was to highlight the importance of the relationship between tourists and local people. More than the standard activities that cities offer, tourists want to build empathy and establish relationships with the hosts, based on what they like and their personality.

**Involve Tourists With Cities by Promoting New Experiences**

Another issue identified through the related work analysis is the importance of creating new experiences for tourists, especially making them feel that they are important for the city and its development and connect them to the local people so they can feel part of the city fabric. These types of feelings can differentiate among travel experiences, making them unique and memorable.

After having defined these two main issues, the idea was to transform them into requirements of the Share Portugal platform. Share Portugal followed an iterative and incremental approach with an emphasis on prototyping and user testing, where users had a crucial role in the process of providing feedback that is progressively incorporated until reaching the final prototype.

### 3.2 The Metaphor

As we wanted to build an interactive and immersive platform, our first concern was to create a metaphor that could simply represent all the information and ideas that we want to convey, but at the same time creating a strong visual impact on the users, while maintaining the opportunity to create immersive and intimate interactions.

The information and messages were intended to be communicated visually rather than through abundance of text. In addition, as noted earlier, we wanted focus on hosts, what they like and their different personalities.

With all of this in mind, our first interface iteration had a photo of the hosts available on their profile. As people are the most important part of the platform their faces where a good initial hint for tourists to recognise whether they empathised (or not) with the local person through their expression, for example.

The second issue to tackle was to find a way for local people to show their interests and some aspects of their personalities. To achieve this, we decided to represent them through a place in their household where they spend a good part of their lives, possibly their living room. Usually, the way we decorate our home, the colors, the elements, or even the posters we choose to have on our space, are very related to our interests are and who we are. In addition, when we invite someone to our home, we have some degree of confidence with the visitor, and usually we want the guest to feel comfortable. Given this, the living room should be highly customisable by each of the locals, according to what defines them, while
keeping in mind that some of the elements should be related to the activities offered by the hosts.

Finally, in order to connect the hosts and the locals in their living room spaces, we needed a higher level container, where all hosts living spaces could be showcased. This took the form of the façade of buildings, in which the living rooms were contained. The chosen buildings to feature on the interface are iconic buildings of the hosting city. This would represent the home page of the platform. Each window of these buildings would consist of the pictures of each local registered on the platform and it would be possible to visit their living rooms. Moreover, through showcasing the iconic buildings of the city, the tourist is invited to explore the city, find the various iconic buildings and the various elements that characterise the location they are visiting. Our design choices were geared towards providing a highly interactive site, immersive, and able to convey the personality and preferences of each hosts as well as the architectural characteristics of their city of origin.

3.3 Tasks and Questions

Before starting to develop the platform structure and back end, the driving concept and initial interface needed to be tested in order to get to know if it actually met the needs and wants of our users, what functionalities could be important to them. We tested with both for tourists and locals. To do so, we developed some tasks and validated them with users, in order to receive some feedback to improve the platform.

To achieve this, we showed the concept and initial ideas to five users that travel with regularity and five Lisbon locals and asked them to perform certain tasks (described below) and finally conducted interviews to elicit their feedback.

1. **Explore the city (through the Platforms interface) and enter in the living room of a local person with whom we identify**

   (a) **Description:** This task allows the tourist to explore the city and discover the living room of a host with whom he/she identifies, witnessing the activities offered by the local.

   (b) **Questions:** Is the exploration of the city done in a clear and intuitive way? What led the tourist to choose a certain local and not another?

2. **See the city in day — and night — time.**

   (a) **Description:** The tourist can change the view of the city between day and night.

   (b) **Questions:** Is the way to change the view between day and night intuitive and clear? Is the experience between day and night different?

3. **The tourist signs up for a local person’s workshop.**
(a) **Description:** This task allows the tourist to enroll in a workshop created by a host.

(b) **Questions:** Is it clear and intuitive for the tourist how to sign up for a workshop and understand the information related to it?

4. **Understand the interests and personality of locals by the decoration of their living room.**

   (a) **Description:** The tourist can understand what are the interests of the host and cross empathy with him, through the decoration of the living room.

   (b) **Questions:** Is the living room decor a good starting point for understanding if the tourist empathises with the local person?

5. **Find out if the local person has enough freedom and options on the platform to be able to express their tastes.**

   (a) **Description:** The host customises their living room to see if the personalisation options presented are appropriate to showcase their personality.

   (b) **Questions:** Does the platform provide enough freedom to convey the tastes and interests of the local person?

### 3.4 Low Fidelity Prototyping (LFP)

Before carrying out the validation study we had to develop the low fi prototype in order to test our initial ideas. We opted for paper prototyping techniques as users don’t feel intimidated by low fi paper prototypes, even if they are not technology savvy. These kind of prototypes are very useful to uncover major issues in the very initial phases of the project, or to test features in a rapid way at any stage of the project.

#### 3.4.1 The Sketches

**Explore the City**

Based on the concepts explained in the previous section, we started by designing the low fidelity prototypes.

As we can see in Fig. 3.1, the home page is composed of several iconic buildings of the cities introduced in the platform, and also by characteristic elements of it (for example, the Portuguese sidewalk). In our case, since we always had the Há-Vita platform as a starting point, for our case study we used the city of Funchal to illustrate our platform.
Navigation along the city is made through a horizontal scroll bar where in every moment just a small part of the whole city is focused.

Another feature we found interesting during the conception of this prototype was the possibility of tourists to also have a perspective of how the city is during the night. Again, this feature would make the environment more realistic, immersive, and give more insight according to the time at which the user visits the city.

**Figure 3.1:** Sketch of the Low Fidelity Prototype - The home page
The Living Room

As for the living rooms, as we can see in Fig. 3.2, we established we wanted to have several components that fulfilled many roles to convey the characteristics of each local.

So, our initial idea was that the leftmost part the room (zone A) had decorative elements customised by the hosts according to their personal taste; in the zone to the right (zone B) some personal information would be shown about the local, as well as the activities that they provided; finally, in the area where the computer is located (zone C) it would be possible for the tourists to get in touch with the local person.

The virtual room also made possible the customisation of some elements, the colors of the bedroom wall and some furniture could be completely customisable.

Figure 3.2: Low Fidelity Prototype - The living room area
3.4.2 Validation

After sketching the various concepts we had in mind, we had a good starting point for doing some user testing in order to realize if the subliminal messages we wanted to pass were successful and if the application had the usability and immersiveness it required.

This validation was done informally where we asked users to give feedback about the experience by thinking aloud.

Some interesting suggestions were presented, namely regarding the navigation of the city and the feature of the day advancing to night as the exploration of the city progresses.

All issues raised during this validation were noted and implementes in the following iterations of the prototype. In this section we will present the feedback received during the validation of the first low fidelity prototypes.

Exploring the City

Two new suggestions were offered on how to navigate along the city. The first was to always have the view of the entire city in miniature, placing the slider only in an area the user wants it to be visible. Some users said they felt they could get a greater overall outlook of the city.

The second was an addition to the prototype horizontal scroll: the suggestion that the city also move through clicking and dragging.

Day to Night

As for the way of having the prospect of the city either by day or by night, some questions arose as how this could be achieved.

In our prototype, as the user progressed in the horizontal scroll the day grew darker. One of the aspects the users did not like was that the buildings further into the city had to be always be seen as if it were night. Some of the people who tested wanted to have the freedom to see the same part of the city at night or day.

Another idea concerned the application being sensitive to the time of day it was being used and representing the city as day or night using the actual time. However, this suggestion did not meet one of our goals, which was to give freedom to the user of the application, so that he/she identifies itself more easily with the application.

Thus, ideas came up to place a button that allows switching between day and night. This button could take two forms: the first was a simple and practical button that changed between day and night, and the second was a clock-shaped button where the user could choose between several times of the
day.

**The Living Room**

In the living rooms of the local people, users asked some questions about the freedom they would have to add elements. They questioned whether the elements would be selected within some already predefined ones or if they could be added freely.

In general, users demonstrated that through the different customisations of the living rooms, they were able to convey well the tastes and personalities of the various hosts, namely through the posters on the wall.

### 3.5 High Fidelity Prototyping (HFP) I

As our platform would have a very strong visual component, we felt the need to create high fidelity prototypes to validate all our ideas. Many of the issues and problems raised by users in low-fidelity prototyping tests were rethought in these new prototypes so that they could be tested again.

These new prototypes already contain more variables to take into account in the tests with the users, mainly because we already introduce color and elements closer to what the final design will be.

#### 3.5.1 Previous Problems

Taking into account the suggestions and the low fidelity prototypes that were created in the first validation with users, for this second validation, in cases where a decision was unclear, we decided to test the two forms, now in high fidelity, in order to understand the advantages and problems of each one, and in which the users felt more comfortable to use.

For this, we used the technique A/B testing, with five tourists and five locals, where we presented two different ways for accomplishing a task and the users explained which one they preferred and why.

**Exploring the City**

The high-fidelity prototypes of the two possibilities of navigation by the city previously explained are shown in Fig. 3.3 and Fig. 3.4.
Figure 3.3: Hight Fidelity Prototype - The slider navigation

Figure 3.4: Hight Fidelity Prototype - The horizontal scroll bar navigation

When we tested these two possibilities, most of the users claimed that the horizontal scroll bar was
more intuitive and made them feel more like discovering of the city, rather than having a wider view of the city panorama. In addition, they found that visually, with the slider, the platform became more appealing and cleaner.

**Day to Night**

In Fig. 3.5 and Fig. 3.6 we can see the high fidelity prototypes of the suggestions raised in the previous validation on the question of changing the city view between day and night.

**Figure 3.5: High Fidelity Prototype - Clock-shaped button**

Here we tested both possibilities with the users, and it was clear that they preferred the option of a toggle button that allowed them to switch between day and night view, instead of a clock, since they reported that it was simpler and more intuitive and that they felt more control.

**The Living Room**

As for the living room we chose only to visually implement the ideas we had in low fidelity prototypes. At this stage, with some decorative elements as an option and with already some elements such as the wall colors, for example, we wanted to see if questions would be raised again about the freedom of rooms’ customization.

In Fig. 3.7, we can observe the high fidelity prototypes of the living rooms.
Although users now have more room customisation elements, they once again questioned about the elements that could be freely customisable, and which ones were limited to a predefined range of the application.

### 3.6 High Fidelity Prototyping (HFP) II

#### 3.6.1 Living Rooms

In order to make the platform even more robust and appealing, and to overcome the problem raised by the freedom of choice of elements in the living room, we further iterated on the prototype, and refined the living room aspect and functionalities based on the feedback of the users.

Our major problem here was finding a middle ground between giving freedom for the host to customize the room as much as possible, and restricting the variety of elements and options that the platform would offer, because it was also important for us to maintain some levels of consistency to keep the platform cohesive.

To solve this problem, and since we couldn’t find an optimal solution, we compromised on having two types of personalities, one linked to new technologies and the modern world, and one more traditional one.

Thus, locals will be able to choose between a living room with objects and decorations related to new technologies such as computers and a setup resembling an office, and a second one with more conservative decorations, such as books and old furniture.

In Fig. 3.8 we can see the two types of room above mentioned.
The customisation feature of the wall and the furniture color of the room was kept. In this way, we achieved some balance between the elements that the application would have to maintain constant and the freedom of the user to decorate the living room in their own way. Additionally, the interface looks more cohesive and consistent.

3.7 Architecture

Our platform was developed following a layered architecture because not only supports the incremental development of systems, but also changeable so an equivalent layer can replace another one. Moreover, when some layer is changed or updated, only the adjacent layer is affected [22]. Also, every layer of the Share Portugal application can be used individually with other similar applications or can be easily changed without compromising the other layers.

The three main layers that compose our system are the Presentation, the Business and the Database Layer, as can be seen in Fig. 3.9.

The front-end will be a single-page application that requests data to the back-end and displays it using some visualisation techniques. The communication between both sides is made through a web Application Programming Interface (API) with standard Hypertext Transfer Protocol (HTTP) requests. The API defines a set of paths, accessible through these HTTP requests in order to exchange data in the JavaScript Object Notation (JSON) format. Therefore, the back-end is responsible for handling requests incoming from the front-end, which may involve data processing and delivering it in a known format, such as JSON. After a certain user interaction with the application on the front-end, a corresponding data request will be sent to the back-end. Once the response from the back-end reaches the front-end, it will manipulate the data to form the visualisations, corresponding to the user request. This kind of architecture is flexible enough to be scalable if new features or methods need to be added later. The separation between data processing logic on the back-end and visualisation or application logic on the
front-end facilitates the project organisation and future work.

### 3.7.1 Database Layer

The Database Layer is responsible for managing all the data that we use in the Share Portugal platform. It receives data from the website users and answers the requested information from the Business Layer. As we can see in Fig. 3.10, the first step was to create an entity-relationship model in order to model the database and to figure out which entities we would need based on the high fidelity final prototypes.

When we create this model and it is validated, it’s relatively easy to implement it in the future in the code, and to discard at the outset some errors that could happen. In addition, it is important that we have a general picture of the structure of our platform.

For the database we used MongoDB, which is an open-source document database, that was designed to be robust, flexible and scalable [23]. It uses an ordered set of keys with associated values that in JavaScript are represented as objects. We decided to use this type of database since it is an open-source project that allows scalability in the future, and it uses objects that allows the storing of all kinds of data quickly.

It should also be noted that the system is prepared to be easily customised and to receive new values if the project has any changes in the way we approach some of its points.
3.7.2 Business Layer

The Business Layer is composed by a server is built using Node.js [24] and provides an open API where everyone can retrieve the data recorded in the database.

The API that exposes the service is a REST API that uses HTTP requests to manage the data. This type of API has numerous advantages for client applications as well as the server, since it’s a scalable, flexible and a portable solution. It’s also a stateless solution, meaning that each HTTP request has enough information so that both the client and the server doesn’t need to save any type of state.

The main advantage of this solution is its independence. Due to the separation between the server and the client, it’s possible to develop the various areas of the project independently. It’s also possible to develop multiple types of clients that use the same API to retrieve the information.
For all entities described in database layer the server API has four types of requests. A GET request to enable the retreat of information, a PUT request so that it is possible to put information to be kept persistently, a PATCH request to enable change information already stored, and a DELETE request to delete information that had been stored persistently.

In order to save the data in a persistent way, we choose a NoSQL Database mongoDB [23] because we gain numerous advantages such as:

1. Non-relational and schema-less data model;
2. Low latency and high performance;
3. Highly scalable;
4. Object-oriented programming that is easy to use and flexible.

Since we are using Node.js, we chose the use of the Express framework\(^1\). Express is a web application framework that provides a robust set of features for web and mobile applications. The main advantage of this framework is the offering of all sorts of routing features including routing; separate handlers for GET, PUT, POST, and others; variables pulled automatically from URL; and many more advantages that makes developing a web server an easy task.

The URL (http://localhost:3000) for the request is the IP address of the machine where the service is running, in which case it is running on localhost, followed by the route we need.

Among these routes we have:

**Locals:**

- `/locals` - Operations on locals, where we make operations on the local people registered in the application
  - **List of operations:**
    - GET - Retrieve the list of all places registered in the application

- `/locals/{localId}` - Operations for a specific user
  - **List of operations:**
    - GET - Retrieve a local by id
    - PATCH - Update a local informations by id
    - DELETE - Remove local by id

\(^1\)https://expressjs.com/
• /locals/signup - Operations for creating a new user
  
  – List of operations:
    • POST - Create new user

• /locals/login - Operation to login from a local person registered in the application
  
  – List of operations:
    • POST - Introduce login information

Activities:

• /activities - Operations on activities
  
  – List of operations:
    • GET - Retrieve the list of all activities saved in the application
    • POST - Creation of a new activity in the application, which is associated with a specific user

• /activities/{activityId} - Operations for a specific activity
  
  – List of operations:
    • GET - Retrieve an activity by id
    • PATCH - Update an activity informations by id
    • DELETE - Remove an activity by id

Room Style:

• /roomstyle - Operations on the personalization information of the elements of the living room of the locals
  
  – List of operations:
    • POST - Creation of a new default living room for new users

• /roomstyle/{roomstyleId} - Operations for a specific living room
  
  – List of operations:
    • GET - Retrieve the living room elements of a specific user
    • PATCH - Update the living room elements of a specific user

Therefore, with these well-defined and structured routes this REST API allows the data to be accessed and used by other applications that only need to be made to a specific call.
3.7.3 Presentation Layer

The third layer is the Presentation Layer, which is responsible for presenting the views of the city and the living rooms to the user, and where it is possible the interaction with them and the obtainment of the desired visualisation. This layer will interact with the business layer through calls to the REST API.

For the development of this layer, we have used the Vue.js\(^2\) which is an open-source JavaScript framework for building user interfaces and single-page applications. We chose to use this framework due to the fast learning curve and good performance for the features that our application would have.

We also used HyperText Markup Language (HTML)\(^3\), Cascading Style Sheets (CSS)\(^4\) and Bootstrap\(^5\). The HTML is used to structure the entire platform, the CSS and the Bootstrap are responsible for the style of the application. All logic was made using the JavaScript and Vue.js libraries.

3.8 Functional Prototype

Once the graphic design was completed we started implementing the high-fidelity prototype. That should be as close as possible to the final representation of the system. In this phase, some users (tourists and locals) evaluated the system once again, since we are following an iterative and incremental model. This evaluation was being done through direct observation and think aloud technique, followed by a briefing about Share Portugal platform.

The last step was to construct a second version of a functional prototype. Its testing consists of performance user tests. Since the approach is iterative, prototypes generated during one session were reused or revisited in another with the same or a different set of stakeholders. When problems were found in user testing, they were fixed, and then more tests and observations were conducted to see the effects of the fixes.

3.8.1 First Version

Given the requirements and tasks that we intend to respond with our application, we split our platform into several smaller sections. As our final work will be a single page application, we decided to separately develop the main page, the tourist-side living rooms and the living rooms on the side of the locals, incorporating everything later.

The technologies used at this stage of development were then: Vue.js, an open-source JavaScript framework for building user interfaces and single-page applications which uses HyperText Markup Language (HTML) for the page’s construction, Cascading Style Sheets (CSS) for its styling and JavaScript

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\(^2\)https://vuejs.org/
\(^3\)https://developer.mozilla.org/en-US/docs/Web/HTML
\(^5\)https://getbootstrap.com
for overall interactivity across the page. In addition to these technologies, we often used Adobe Illustrator
to make some adjustments to the SVG files we had available from the various visual elements presented.

### 3.8.2 Explore the City

We decided to start developing the home page, where the exploration of the city would happen. We
choose to start with that part of the application because it is the starting point to build all the other tasks
of the platform.

Following the latest validated prototypes, we split the page into three main features: navigating the
city where the buildings moved through the horizontal scroll bar, loading and positioning the photogra-
phies of the local people on the windows of the buildings and finally the change between the view of the
city by day and by night.

#### Horizontal Scroll Bar

The main idea of the horizontal scroll bar is to give the user the feeling of navigation throughout the
city, as if the city scrolls along the screen. To be easier to explain, the method used to create this effect
can be analyzed on the Fig. 3.11.

![All City Viewport](image)

**Figure 3.11:** Method for navigation throughout the city

As we can see in Fig. 3.11, the way we thought to implement this sensation of movement was to
create two main divisions. In the first (in pink) we have the complete city, all the buildings we want to
have available; and in the second (in blue) we have what we want to be shown on the screen of the user
at any given time. The notion of motion will be introduced by moving the “All City” division along the fixed
“Viewport” division. To do this, we change at every new event the position property (only horizontally) of
the CSS of the “All City” division, giving the effect illustrated in the Fig. 3.12.
However, to vary the values of the "position" property, we have to give the user control for this to be possible - a horizontal scroll bar (Fig. 3.13).

This bar had already been tested and validated on high fidelity prototypes, and at that time users reported that the best position to put it would be in the center of the screen, in the lower zone, given it was the place where it would least disturbe the exploration of the city.

For the implementation of this bar, we have used a library of Vue.js called Vue Slide Bar\(^6\). This

\(^6\)https://www.npmjs.com/package/vue-slide-bar
library gave us a simple slide bar that, when dragging the bar, the output values increased or decreased depending on whether the drag was forwards or backward, as illustrated in Fig. 3.14.

![Output Values](image)

**Figure 3.14:** Output Values - In the top bar the output value is 10 and the bottom value is 70

We just had to force the position variance of the CSS position of the “All City” division, of Fig. 3.11, to each new event recorded in the slide bar — in other words, each time the slide bar is changed.

Additionally, we had to assign the value 100 (maximum value of the slide bar) to the final position of the “All City” division and the value 0 (minimum value) to the initial position of the same division.

**Photographs of the Locals**

The photographs of the locals registered in our application appear on the windows of the city’s buildings. When users visit the platform and they want to enter inside the living room of a host, they should click on their respective photo.

As the photograph of the hosts is the first impression that tourists will have of the person, it was important that it was of an acceptable size and format for this purpose. Thus, during the design of the buildings, one of the requirements we imposed was the style of the windows of the buildings, that should be square and have a generous size.

Therefore, our first task was to create and position divisions for each of the windows. Since we want that, when the buildings move, the various windows follow this movement, we used the z-index property of the CSS to position these divisions in a layer above the “All City” division, as shown in the Fig. 3.15. Additionally, this placement of the windows on an upper layer is also important to make the windows clickable.

With the placement of where the images would be, we needed to fetch all the photos of all the hosts registered in the application. To do this, we do a GET call to the API at the URL http://localhost:3000/locals, where a JSON file with all information from all locals is answered. With this JSON, we filter only the information relative to the path of the images to be filled along the divisions created previously, as shown in the Fig. 3.16
Once this is done, the windows will be filled in order (from the first building to the last one) with the various photographs of the hosts giving the effect shown in the Fig. 3.17.
Day to Night

As explained earlier, for the city change between day and night views, we have chosen to put a button that toggles between these two states.

![Day to Night Button](image)

**Figure 3.18:** Toggle button that switches between day and night view

As we have all the final arts of the buildings and background either in the day version and in the night version, the easiest way to make this change was to make a function that toggles between the image files loaded by the desired state. So, when the button is active to be in the day view, we load the respective day images, and when it is active the night mode we load the respective images at night in CSS background-image propriety.

For this change of state to be smoother we also put an animation of fade out and fade in.

After the first part of the implementation of the homepage where users can explore the city, we have a good base to continue working on other sections that will connect to this later, namely the living rooms of the locals, explained below.
3.8.3 Locals Living Rooms

With the home page ready, where the exploration of the city happens, we decided to move to the implementation of the living rooms of the hosts.

The living rooms will have two types of view: one on the side of the local, where they have access to all the controls of the room’s personalisation and creation of activities; and another on the tourist side, where we only have to access the final information and customisations introduced by the locals. Since many of the implementation sections will be identical in both views, we have chosen to start with the side of the hosts that is the most complex one.

Following the latest validated prototypes, we split the living room into three main issues: the personal information menu, where users introduce some important personal information; the room customisation area, where hosts can visually customise their room; and the create activity menu, where locals can create their activities and enter information about them.

**Personal Information**

The area of Personal Information is where the host should enter some personal information that will be important for the view of the room on the tourist side. It is in this section that the local defines the photo desired to appear in the buildings window, name, email address and a short biography where it’s made a presentation about he/she.

For the local to enter this information, we created a menu that receives these values by the user, as shown in the Fig. 3.20
When the user creates an account and enters in this menu for the first time, the fields are completed in as follows:

- **Picture Link** - a default image for all new users
- **Name** - name entered when the account was created
- **Email Address** - email entered when the account was created
- **Biography** - field to be completed

For all of this information to be loaded, each time we enter the route of a local person's living room, a GET call is made to the API at the URL http://localhost:3000locals/{localId}. In response to this call, we receive a JSON file with the information shown in Fig. 3.21.
It is important to note that the localId value is passed through the route that is loaded after the user logs into the application, as will be explained in more detail in the section on Sign Up and Login.

On the other hand, when the user updates each of these fields and clicks the “Submit” button, a function is called that forces a PATCH call is made to the API, again at the URL http://localhost:3000/locals/{localId}, as shown in Fig. 3.22.

**Room Customisation**

The Room Customisation section is where the host is invited to customise the living room according to their likes, interests and personality.

Among this customisation, hosts will be able to choose some things, including the type of living room they prefer, the color of the wall, the colors of the wall pattern, and the image they want to have on a wall poster, as presented in Fig. 3.23.
As explained before, after the validation of the high-fidelity prototypes, the user will have the possibility to choose between two types of living rooms:

- **Type 1** - A living room focused on new technologies and the modern world
- **Type 2** - A more classical living room with more traditional furniture and décor

The way we used to implement the change between the view of the living room of Type 1 and Type 2 was to create two divisions, and within each of them to build each type of living room. These divisions are activated or deactivated through a Boolean variable, as presented in Fig. 3.25. Thus, when the user clicks on the type of living room they want to use, it's called a function that changes the corresponding boolean variable by making the desired living room type appear.
For customising the color and pattern of the living room wall, we have used several divisions with layers at different levels. Thus, we have a division on the back-most layer that is colored with the color code that the user chose among the possibilities offered. Immediately next, we have a layer with the
image of the pattern chosen by the host, and if that choice changes, the image of this layer is changed in the CSS by the corresponding pattern, as shown in the Fig. 3.26.

![Figure 3.26: Implementation of color and wall pattern](image)

The advantage of having all the artwork in SVG format and separated by elements is to have this flexibility of being able to change what we want in a simple way.

About the photograph on the wall of the living room, the user is asked to enter a url of an image and it is placed in a delimited and cantered division with the frame in SVG.

![Figure 3.27: Implementation of the photograph on the wall](image)

When a new local creates a new account, a living room with default customisation is created. Therefore, when the page is loaded, the GET is called to the API at the URL http://localhost:3000/roomstyle/roomId. In response to this call, a JSON file is returned with all information about the personalisation settings of
the respective living room, as shown in Fig. 3.28.

![Diagram](http://localhost:3000/roomstyle/roomld)

**Figure 3.28:** GET from [http://localhost:3000/roomstyle/roomld](http://localhost:3000/roomstyle/roomld) JSON response

On the other hand, when the user finishes customising the living room and clicks the "Submit" button, a function is called that enforces a PATCH call to the API, again at the URL [http://localhost:3000/roomstyle/roomld](http://localhost:3000/roomstyle/roomld), as shown in Fig. 3.29.

![Diagram](http://localhost:3000/roomstyle/roomld)
```
submitRoomChanges() {
    var vm = this;
    axios.patch(this.roomstyleUrl + this.roomstyleId, [
        {
            propName: "wallColor",
            value: vm.wallColor
        },
        {
            propName: "tableColor",
            value: vm.tableColor
        },
        {
            propName: "frameImage",
            value: vm.frameImage
        },
        {
            propName: "wallPattern",
            value: vm.picked
        },
        {
            propName: "roomNumber",
            value: vm.room
        }
    ]);    
    this.roomDefinitionsOn = false;
}
```

**Figure 3.29:** PATCH call from http://localhost:3000/roomstyle/{roomId}

**Create Activity**

As explained earlier, an important feature of our application is the possibility of local people to create activities where tourists can participate, like a workshop, for instance.
To create an activity, users must complete the following fields:

- **Activity Picture Link** - an url to an illustrative picture of the activity
- **Activity Name** - the name of the activity
- **Where** - the place where the activity will take place
- **When** - when will the activity happen
- **Activity Info** - some relevant information about the activity

When the user has filled the fields and clicks "Submit", a POST call is made to the API at URL http://localhost:3000/activities, as shown in Fig. 3.31.
After this call, the new activity is shown in the frame that has the function of listing the various activities of the users, as shown in the Fig. 3.32.

![Image](image.png)

**Figure 3.32**: Presentation of the new activity created by the user

**Living Rooms from the Tourist perspective**

As noted earlier, we started by implementing the living rooms on the side of the local person who logs into the application and who enters your area if you are a user. However, all this customisation serves to present a living room to tourists who visit the platform, very similar to the one presented on the side of the hosts, but with information important about them.

These small differences are only noticed in the way information about hosts and their activities are presented.

As shown in Fig. 3.33 there are two main differences:

- **Mobile Phone** - the living room has a mobile phone with a notification that, when clicked, opens a menu that allows the tourist to see the photograph of the host in full size, read his/her biography, and send him/her an email to get in touch (Fig. 3.34)

- **Activity Poster** - if the local has created some activity, it will be shown a poster illustrating it. When the tourist clicks on this poster, a menu is opened that allows to read all information about the activity and send a message to the local to obtain more information or just to register for it (Fig. 3.32)
Figure 3.33: Differences between the living room viewed from the side of the locals (left) and the tourists (right)

Figure 3.34: Mobile Phone

The entire implementation to get all the information about the host, the living room, and the activities is done the same way previously explained in the living room seen from the side of locals.
Sign Up and Login

As each host has its own user zone, we had the need to create a Sign Up and Login system for each of the users. This is an important feature because it is the one that will give identification to each of the locals and that will allow them to access their personal areas.

Sign Up

To create an account, the host is asked to fill in three fields: name, email address, and password.

In this step, when a POST call is made to the URL http://localhost:3000/locals/signup, our API verifies that there is no user with the same mail address entered in the database. If it exists, we ask the user to enter a different email address. If the user did no exists, we save his information in the database using bcrypt\(^7\) library to help us with the hash of the passwords, as shown in Fig. 3.37.

\(^7\)https://www.npmjs.com/package/bcrypt
On the presentation layer side, the process for creating a new user is:

- Verify that all fields are filled in
- Call POST to the API at http://localhost:3000/locals/signup URL passing the user-filled attributes and a default profile image to the new user
- Call POST to the API at http://localhost:3000/roomstyle URL passing as attributes some important values for creating a default room for the new user
Figure 3.38: Presentation Layer - Code for creating a new user

After the user completes this phase, they are asked to sign in to their new account.
Login

In order to log in to the application, the host must enter the email address and password.

![Login Menu](image)

**Figure 3.39:** Login menu

After these two fields are entered, a POST call is made to the API at http://localhost:3000/locals/login URL where the following tasks are executed:

1. Search by email provided by user
2. If the email exists, use the bcrypt library again to compare the password entered by the user with the password stored in the database
3. If all else matches, return a JSON file with token and the id of the user
Figure 3.40: API - Code for login authentication

On the side of the presentation layer, when the id and token of the user is received, this is passed in the route for loading the respective living room and personal area.

Figure 3.41: Presentation Layer - Code for id and token to be passed on the route
Evaluation

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4.2 Discussion ....................................................... 72
After finishing the last cycle of development, a set of users tested the Share Portugal application in order to gather quantitative and qualitative usability metrics to ensure that our usability meet users’ needs. The evaluation consisted of usability tests with users, in order to evaluate the system regarding interactivity and usability. This evaluation aimed to test the Share Portugal from the perspective of tourists and local residents, so two different tests were performed, one for each user group.

4.1 Usability Tests

When the final version of the platform was completed, a group of fifteen tourists and fifteen locals tested the system, Share Portugal. This evaluation was done to assess the pros and cons of the final prototype and to check that a standard was upheld, process known as summative evaluation [25]. Users are presented with a list of tasks, and their performance was evaluated through quantitative measures: the time it takes the user to do the task, the number of errors made (if any), and the level of satisfaction while doing such tasks.

The evaluation degrees were as follows: a preparation stage where all necessary materials were designed and created; the actual testing following a well-defined protocol; and, after, the analysis and discussion of the gathered results was done.

4.1.1 Protocol

Before the tests were carried out, preparation was needed to ensure that everyone followed the same protocol. For this, it was necessary to develop a test script with the order and description of everything users had to do, and questionnaires to be filled out by them.

As a requirement for the evaluation process, it was established that it should be done with at least 30 users (fifteen tourists and fifteen locals). We used a sampling technique called Convenience Sampling, which means that our users were selected because of their convenient accessibility and proximity to us, not being made any restrictions on the basis gender or educational background.

Although, as we established that all subjects should have the same conditions of evaluation, we used a controlled and typical use context environment and also the same tools to perform the tests.

All our tests pursued the following order:

1. A profiling survey was used to collect key demographic information about our users, such as gender, the range of age, education, and origin country.

2. A contextualisation about what is Share Portugal and the current evaluation goals was given to users. This consisted on following a prepared script to ensure that we did not forget to explain anything, and to ensure every user knew the same.
3. A set of five questions were prepared. Before answering each question, the user had to perform the corresponding task in our system, always highlighting that what was being tested was the Share Portugal system, rather the participants, to give more confidence and comfort to explore the system. We asked them to inform us when they were ready to do the task so that we could collect the time duration and number of errors made.

4. Debriefing about the previous stage was carried out after users performed the tasks questions phase of the study.

5. A second survey, to understand the users level of satisfaction while doing the tasks. For this we used the System Usability Scale (SUS) - a simple, ten-item scale giving a global view of subjective assessments of usability [26] about the user experience with Share Portugal. We followed the guidelines established by Brooke [26]: each question had a degree of disagreement or agreement, with a range from Strongly Disagree (1) to Strongly Agree (5) respectively, from which the user could choose. Users were asked to answer each question with their true opinion, but we recommend them not to think too much about it, and if undecided to pick the middle score of the presented scale.

6. We offered some chocolates to thank everyone for their participation.

The five questions asked to the tourists were:

1. With city view as a starting point, imagine that you are a tourist in this city and navigate in the city from one end to another.

2. With the city view as a starting point, imagine that you are a tourist and want to experience the city in a night perspective. Change the view of the city from day to night.

3. With the city view as a starting point, navigate through the city, visualize the locals in their windows and enter in the living room of one local with which you identify yourself.

4. With the living room as a starting point, imagine that you would like to attend to the workshop promoted by the local. Sign up to the workshop writing “I want to participate.”

5. With the living room as a starting point, imagine that you would like to contact the local. Send him an email saying “Hello!”.

The five questions asked to the locals were:

1. With the city view as a starting point, imagine that you want to sign up in the application to share content with the tourists. Create a new account in the platform with the following information:
• Name: User Test
• Email address: test@test.com
• Password: 1234

2. With the city view as a starting point, consider that you already have an account in the application. Login in the application using the following information:
• Email address: test@test.com
• Password: 1234

3. With the living room as a starting point, considering that you want to modify your personal information so that the tourists know you better. Change your biography for "I'm a Local".

4. With the living room as a starting point, considering that you want to customise your living room and change:
• Type of Room: Type 1
• Wall Color: White
• Wall Pattern: Yellow and Blue
• Frame Link to: https://i.imgur.com/yu6powR.png (tab 2)

5. With the living room as a starting point, considering that you want to do a workshop, create a new workshop in the application with the following information:
• Picture Link to: https://i.imgur.com/aOFnwFD.png (tab 3)
• Activity Name: Poncha Workshop
• Where: Funchal
• When: 01/05/2019
• Activity Information: “In this workshop we will learn how to make poncha.”

At the end of the five tasks, we asked users to use the living room as a starting point, to customise the room in a free way, without counting the time and errors.

4.1.2 Results

Considering all users involved in the tests, both tourists and locals, the demographic data are represented in Table 4.1.
As described in the Section 4.1.1, while users were performing the task to answer each question, the response time and the number of errors made were noted, and at the end, the SUS questionnaire was answered with those results being presented in the next sections.

### 4.1.2.A Response Time

Response time is another measure worth taking a look at since it provides us detailed information about our users behave in the Share Portugal platform. For instance, if a user takes more time than the calculated average it should take, it could mean that some aspects of our platform can be further improved and enhanced, as the final interface is supposed to be intuitive and easy to use.

Regarding the duration time of executing each task, both the results for each user group (tourists and locals) and questions are presented respectively in the Tables 4.2 and 4.3.

In the tables above, statistics about the values referring to the minimum, maximum, and average time spent executing each task are presented, the value of the standard deviation and the confidence interval with the confidence level of 95%. For an even better understanding of the data, we also created a box-plot, presented in Fig. 4.1 and 4.2, that summarises the following measures: median, upper and lower quartiles and minimum and maximum data values.

After analysing the data from Table 4.2 and box-plot from Fig. 4.1, some conclusions could be made.

The max and mean duration time of questions Q1 and Q4 are higher than the others, question Q1 is the one with the highest max, and Q4 is the one with the highest mean, which was expected because it was the most complex question.
Table 4.2: Tourist Users - duration for each question

<table>
<thead>
<tr>
<th>Duration (seconds)</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Users</td>
<td>Q1</td>
</tr>
<tr>
<td>U01</td>
<td>88</td>
</tr>
<tr>
<td>U02</td>
<td>13</td>
</tr>
<tr>
<td>U03</td>
<td>8</td>
</tr>
<tr>
<td>U04</td>
<td>16</td>
</tr>
<tr>
<td>U05</td>
<td>10</td>
</tr>
<tr>
<td>U06</td>
<td>6</td>
</tr>
<tr>
<td>U07</td>
<td>7</td>
</tr>
<tr>
<td>U08</td>
<td>20</td>
</tr>
<tr>
<td>U09</td>
<td>84</td>
</tr>
<tr>
<td>U10</td>
<td>7</td>
</tr>
<tr>
<td>U11</td>
<td>9</td>
</tr>
<tr>
<td>U12</td>
<td>10</td>
</tr>
<tr>
<td>U13</td>
<td>11</td>
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<table>
<thead>
<tr>
<th>Statistics</th>
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<th></th>
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<td>1</td>
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<td>2</td>
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<td>6.67</td>
<td>26.60</td>
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<td>6.29</td>
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<tr>
<td>Confidence Interval (95%)</td>
<td>13.56</td>
<td>1.13</td>
<td>3.18</td>
<td>8.74</td>
<td>2.47</td>
</tr>
</tbody>
</table>

Question Q1 is the one that has a higher max value because it was the first time users had interacted with the system, thus some adaptation was needed, delaying the task itself.

Question Q4 was the most complex because some users, when told that the workshop registration is done by sending a message informing them that they want to participate in the activity, associated this message was supposed to be sent on the mobile phone, where the direct contact with the local person is made. Thus, some of the tourist users first opened the menu of direct messages, sending to local, and only then did they realize that they had missed the task and went back to enter the workshop menu.

Analysing the confidence interval, we are 95% confident that the mean time taken to perform question Q4 on further testing will be between 17.86 and 35.34 seconds, which shows that users are able to understand and perform this task on our system in an efficient and effective way, even if they are unfamiliar with the Share Portugal platform. Questions Q2 and Q3 represent the questions with the lowest minimum and mean duration times, proving these answers were quite intuitive for users. These questions have the smallest value dispersion, showing that users have a high level of agreement with each other.

Since question Q2 is just the click of a button, it’s the easiest. The user only had to find the button
Table 4.3: Local Users - duration for each question

<table>
<thead>
<tr>
<th>Users</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>Q5</th>
</tr>
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<td>51</td>
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<th>Standard Deviation</th>
<th>Confidence Interval (95%)</th>
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</table>

and realize the button changed the view to night mode. Consequently, as expected, it is also the task with the lowest values of the maximum time, standard deviation and dispersion.

From testing with local users, analysing the data from Table 4.3 and box-plot from Fig. 4.2 some conclusions could be made.

The max and mean duration time of question Q5 are higher than the others - this was expected, as it was the question that had the most steps to fill. On the other hand, it is the question that has the highest value dispersion, showing that there is no agreement among users, probably because the writing speed between them is different. Q4 was the most time consuming question, because users are asked to create an activity (a workshop) and fill in the various fields and information about it.

Question Q3 is the question with the lowest minimum, maximum and mean duration times, showing it was quite intuitive for users. This question is the one that has the smallest value dispersion, proving that users have a high level of agreement with each other. As users who are locals didn’t navigate the application in the eyes of a traveller, they are not expecting that there would definitions in the elements of the living room, but rather a menu fit for that purpose. Thus, when asked to edit one of the personal

67
Figure 4.1: Box Plot for time duration to answer the question (Tourists)

Figure 4.2: Box Plot for time duration to answer the question (Locals)
information, they find it easy to find the menu for this purpose.

4.1.2.B Errors

In addition to the measured time, the number of errors that each user committed in each task was also counted. An error occurred when the user could not reach the result without help, when they missed the answer or when they repeated processes they had already done previously. The results recorded from the Tourists Users are present in Table 4.4 and the ones from Local Users in Table 4.5.

Table 4.4: Tourist Users - number of errors made for each question

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<thead>
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<th>Users</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
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</tr>
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Statistics

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Table 4.5: Local Users - number of errors made for each question

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<th>Questions</th>
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Statistics

<table>
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<th>Q3</th>
<th>Q4</th>
<th>Q5</th>
</tr>
</thead>
<tbody>
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<td>0</td>
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</table>

An interesting phenomenon observed during user testing (tourists and locals), was that most of the errors occurred not because the users did not know how to do some task, but because users thought they could perform it in a different way. This also explains that in both cases the errors are always at most 1 because users quickly realised the right way to do the task. In addition, tasks have few subtasks, which consequently decreases the number of errors.

Therefore, analysing the errors in the tests on the side of the travellers, we noticed that question Q5 did not have any mistake made by the users. This makes sense, since the previous task is very similar to this and the user realising it will also perceive this.

On the other hand, the task with the highest error rate was Q4. As explained in the previous section, some users when told the workshop registration is done by sending a message, they associated this message should be sent to the mobile phone where the direct contact with the local person is made. As a result, some users made a mistake while performing this task, as they entered the direct message menu for the host rather than the activity menu.

In the tests of the residents’ side of the city, we noticed that questions Q4 and Q5 didn’t had any errors. This is again related to the fact that task Q3 is in the same menu of tasks Q4 and Q5 and,
therefore, the user already knew where they are located. As there is not much difficulty added in the
submenus, the users performed the task flawlessly, with no errors at all.

Otherwise, the Q3 question was the one with the highest average error. According to our review,
some users, before they went to the menu in the upper left corner, tried to click on some elements of the
living room, expecting some of them were clickable.

After all, the number of errors was positive, since there isn’t any question with more than 50% of er-
rors. The reason for most of the errors was only the confusion between two options on the first time using
the system, but users quickly understood what is the right option, choosing the right one afterwards.

4.1.2.C System Usability Scale (SUS)

The final step in the evaluation of Share Portugal was regarding the SUS questionnaire. We grouped
the user’s questionnaires and for each one of them, and the SUS score was calculated following the
scoring guidelines provided on the works of Brooke [26].

<table>
<thead>
<tr>
<th>Table 4.6: System Usability Scale (SUS) - score from each Tourist User</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Questions</th>
<th>Item Rating (1 to 5)</th>
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</table>

| Statistics | Min | 3   | 1   | 3   | 1   | 4   | 1   | 3   | 1   | 3   | 1   | 70  |
|            | Max | 5   | 4   | 5   | 2   | 5   | 2   | 5   | 2   | 5   | 2   | 100 |
|            | Mean| 4.33| 1.73| 4.20| 1.13| 4.53| 1.20| 4.53| 1.33| 4.20| 1.29| 87.83|

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Table 4.7: System Usability Scale (SUS) - score from each Local User

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<thead>
<tr>
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<th>Q02</th>
<th>Q03</th>
<th>Q04</th>
<th>Q05</th>
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The data from the results of SUS is presented in Table 4.6 and in Table 4.7.

As we can see in the table referring to the tourists users, the minimal and maximum rating given were 70 and 100 respectively, on a range between 0 and 100 and in the table referring to locals were 80 and 100 respectively.

The mean rating of our system was 87.83 points on the tourist side and 90.33 on the local side, based on Bangor et al. [27]. With this average SUS score, we could make a comparison with other metrics before established from alternative systems, to understand if our platform is considered “Worst Imaginable”, “Awful”, “Poor”, “OK”, “Good”, “Excellent” or “Best Imaginable”. By correlating our system, with the adjacent metrics, we conclude that the achieved score falls into the range of what is considered “Excellent” in both types of users.

4.2 Discussion

From the results of the usability tests, we can conclude that Share Portugal has a good acceptance and usability rate. This indicates that both travellers and locals found it easy and enjoyable to use the system, and consequently, we can assume that the main goal of Share Portugal was fulfilled - to have
an easy-to-use system that facilitate contact between them.

Furthermore, many reported that the decoration of the locals’ living rooms had a major impact while creating empathy between both entities, making them feel more comfortable to start a conversation when in comparison with a simple chat platform between locals and tourists. We can infer from the study that the visual style and aesthetics of the interface were important in supporting pleasurable interaction and the customization of the ambients gave a sense of different personality to the rooms, giving the visitors a major sense of intimacy with the hosts, compared to less aesthetically rich means of interaction (such as chat, QA or comment based interaction). Additionally, tourists reported that the way the navigation of the city interface is designed, showcasing iconic buildings of the visited city, made them familiarise with the city itself. This can be considered an important finding and a promoting feature of the Share Portugal home page. Presenting abstracted feature of the architectonical layout of the city being visited, gradually familiarizes visitors with the city. In Share Portugal this is done before taking the visitors inside the locals home, in the interior of their households. This gradual familiarization could be also seen as a desirable feature for such systems.

Finally, hosts reported they felt a closer relationship with tourists from the very beginning of their task of customization of their living room. In fact, while customizing their home interiors for them, hosts were thinking about visitors and felt they were getting to know them by showcasing the various elements of the room. Such customization task becomes an ice breaker and successfully creates empathy by establishing a sense of closeness with tourists.

This result, somehow highlights how hosts, can benefit from feeling empowered in welcoming and proposing suggestions to visitors to their city, overcoming the distance and separation that can occur when encountering strangers, and in particular with some overwhelmed European touristic cities. By giving locals the opportunities to shape the touristic path of the visitors to their city we create opportunities for positive interactions, and sense of empowerment of the locals.
Conclusions and Future Work

Contents

5.1 Achievements ............................................................... 76
5.2 Future Work .............................................................. 77
Tourism has been growing steadily over the last years, impacting on the development of many countries whose economies depend on it. It is then crucial to recognise and adapt to the main trends and transformation problems that will affect the sector in the short, medium and long term.

Nowadays, technology impacts many economic activities, including tourism that emerges from mobility as a form of capital. We use websites and smartphones to buy plane tickets, locate points of interest or even evaluate restaurants and services. Allied to all this, more and more people are not just interested in visiting new places and getting to know new cultures. Travellers are giving more and more importance to the experiences they have when visiting a country, they like to have close and authentic contact with the locals, in a way that they could experience more of the culture of each country.

Share Portugal is a participatory platform that its main objective is to shorten the distance between the travellers and locals, allowing closer contact between both. This platform, on one hand, opens the possibilities for tourists to gain new experiences in the cities they are visiting, making them feel part of the fabric of the city; and on the other hand, allows hosts a sense of agency and empowerment in present their own city and activities to travellers. Through the development phase, an iterative and incremental approach was followed in order to understand and adapt the prototypes in the most useful way possible. After the requirements analysis and validation, some low fidelity prototypes have been outlined before reaching the functional prototype. Share Portugal has been structured following a layered architecture where exists a separation between the data, the server, and the presentation, and where each of these layers can be used and upgraded independently.

After the functional prototype had been finished, we started the evaluation of Share Portugal, performing Usability Tests with fifteen tourists and fifteen locals. The duration that each user took to do each of the fifteen questions was recorded, as the number of errors and the satisfaction grade. From the analysis of the results of the SUS score, we can conclude that our system has a good acceptance and usability by the users.

5.1 Achievements

Share Portugal system meets almost all the requirements we proposed in section 1. With user testing and feedback we received in the various stages of development of our work, the platform grew in accordance with our design goals as well as users needs and wants. Share Portugal emerged as a novel tool that support connection and creates empathy between tourists and locals. Thus, when the contact is established, the link between the two shortens their distance, consequently, the tourist feels more comfortable to be involved in the activities and experiences of the place to be visited and the hosts experience a sense of agency in the management of their city touristic resources. Throughout this process, locals also told us that they felt it was easier to start a dialogue with tourists, as they already
knew their tastes and personalities. In addition, locals themselves felt a more important role in the city, being able to influence visitors directly with their own personal taste and culture.

5.2 Future Work

Regarding future work, we think that scaling our system for more cities beyond Funchal, capital of Madeira upon which the first prototype has been modeled. It should be noted that the system is fully prepared for this functionality, we just need to produce the visual design for the new cities.

On the side of the residents of the city, Share Portugal could have more customisation in the living room and more design elements for locals to express their tastes in a way that more encompassing of the richness of the hosts interests and of the city offerings. This functionality would be easy to implement — we would have to scale the existing elements and add others that could make sense to exist. Possibly users focused groups and probing would inform the choice of further customizable elements to include in the living room.

Having an optimised response for mobile browsing would also be an interesting feature, especially at a time when mobile is increasingly the main route of web browsing. In our work, this functionality was not considered because of the time constrain of the thesis project, but it could be a feature that is developed in the future, considering the way the system is already implemented.

Many features can be added to Share Portugal, since the architecture allows reusing the layers and also easily integrates new features, extending its usefulness.
Bibliography


