

MESG
MESTRADO EM ENGENHARIA
DE SERVIÇOS E GESTÃO

**Online Educational Service Solution
on Ecotourism Context
- Oakland service**

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Master Thesis

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2020-06-07

“Those who don't believe in magic will never find it.”

Roald Dahl

Abstract

Tourism depends directly on people for its services to exist: accommodation, attractions and transports. Ecotourism is a segment of tourist activity that uses the natural and cultural heritage in a sustainable way, encourages its conservation and seeks an environmental awareness through the interpretation of nature, promoting the well-being of the populations involved.

At the same time the world is facing a crisis due to the COVID-19 pandemic, which restricts people's crowding. Given this scenario, tourism needs to look for new solutions to continue to play the important role it has in the global economy.

Ecotourism has an even more valuable position because it sponsors environmental conservation, increases cultural and environmental knowledge and promotes intercultural understanding;

This project aims to create a technological-based educational service in the context of ecotourism replying to this need. In this moment of searching for new paradigms, this research seeks to systematize digitally-based solutions to extend educational content to customers of ecotourism services that promote environmental awareness.

To this end, actors and specialists are consulted for the production of high-quality educational content. It is intended to involve the knowledge of research laboratories, natural science museums, botanical and zoo and natural parks in the production of these contents.

Being aware of how ecotourists demand real, deep and immersive experiences, Service Design is used to develop solutions that enhance and qualify them.

First in an exploratory phase, interviews were conducted with potential customers in order to identify their main requirements. Service providers were also studied on their contents production and activities related to ecotourism to map their offers on the online educational market.

The steps presented in the Multilevel Service Design (MSD) method were followed to execute the design, going through the service concept, service system, until the touchpoints.

Finally, a solution was developed that was iteratively prototyped for an Online Educational Service that meets the requirements of this changing market.

Resumo

O turismo depende diretamente das pessoas para que os seus serviços existam: transportes, acomodações e atrações. O Ecoturismo é um segmento de atividade turística que utiliza, de forma sustentável, o património natural e cultural, incentiva a sua conservação e procura a formação de uma consciência ambiental através da interpretação da natureza, promovendo o bem-estar das populações envolvidas.

Neste momento o mundo enfrenta uma crise devido à pandemia do COVID-19, que condiciona aglomerações de pessoas. O turismo sendo um dos principais afetados, está à procura de novas soluções para continuar a desempenhar o papel importante na economia global. O Ecoturismo tem um papel ainda de maior valor porque patrocina a conservação ambiental aumenta o conhecimento cultural e ambiental e promovendo o entendimento intercultural;

Neste enquadramento este projeto pretende dar resposta a esta necessidade e tem como objetivo a criação serviços educativos de base tecnológica no contexto do ecoturismo. Neste momento de procura de novos paradigmas, este projeto procura sistematizar soluções de base digital para estender aos clientes de serviços ecoturísticos conteúdos educativos que promovam a consciencialização ambiental.

Para tal, consultam-se todos os participantes, atores e especialistas para a produção de conteúdos educativos de alta qualidade. Pretende-se envolver o conhecimento de laboratórios de pesquisa, museus de ciências naturais, jardins botânicos e zoológicos na produção desses conteúdos. Neste processo há uma tomada de consciência de como os ecoturistas são exigentes nas experiências reais intensas e imersivas, e utiliza-se o Service Design para desenvolver soluções que as potenciem e qualifiquem.

Numa fase exploratória foram feitas entrevistas a potenciais clientes com o objetivo de identificar os seus principais requisitos. Estudaram-se também fornecedores de serviços e atividades ligadas ao ecoturismo para mapeamento das suas ofertas já no mercado de âmbito pedagógico e online.

Seguiram-se as etapas apresentadas no método Multilevel Service Design (MSD) para executar o desenho do serviço, passando pelo conceito do serviço, sistema de serviço e o encontro e interação no serviço. Por fim, desenvolveu-se uma solução que foi prototipada iterativamente para um Serviço Educativo Online que atende às exigências deste mercado em transformação.

Acknowledgments

I am deeply grateful to my supervisor, Teresa Sarmento, for her constant support, patience, hours of discussion and guidance during the development of this thesis.

I have no words to describe how much I thank my parents and my brother, who supported me in my decisions throughout this process.

To all MESH's colleagues and professors, who have always helped me throughout this master's degree path and who contributed to my personal and professional development.

I thank all the interviewed participants and the institutions that answered the online questionnaire, namely Dr Maria João Fonseca from the Biodiversity Gallery of Porto.

Finally, I want to thank all my precious friends who made this moment possible. I am especially grateful to my friend João, who has always proposed solutions to many of my problems.

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List of abbreviations

COVID-19 – Corona Virus Disease

SDG - Sustainable Development Goals

S&P 500 – Standard & Poor's 500

WEF - World Economic Forum

GDP – Gross Domestic Product

SD – Service Design

UNWTO – World Tourism Organization from United Nations

UN – United Nations

TPACK - Technological Pedagogical Content Knowledge

CIBIO – Research Centre in Biodiversity and Genetic Resources

MHNC-UP – Museu de História Natural e da Ciência da Universidade do Porto

B2B – Business to business

B2C – Business to consumer

SMART - Specific, Measurable, Attainable, Realistic, and Time-bound

PESTEL – Market analysis method

ROI - Return on Investment

1 INTRODUCTION

No container is suitable for all contents.

Jorge Wagensberg, in the Total Museum 2007

Due to the COVID-19 pandemic, the world faces a new reality, in which most nations have adopted social isolation measures to contain the spread of the coronavirus. Given this scenario in which mobility is reduced and physical borders have been practically closed worldwide, what solutions indicate how world tourism, especially ecotourism, can overcome this situation?

In this context, it is important to look at the world that remains united, integrated, and that works as a vehicle for communication: each day more embraced through internet.

Ecotourism, facing consumers who demand experiences and are currently unable to enjoy natural environments, has the opportunity to join technology to develop services that not only meet current demand but also establish a new market segment focused on production of online content and keep working on awareness of issues related to climate changes. In traditional tourism, science is presented to the public through museums. Having said that, these days Ecotourism is communicating more than ever via the internet. In both cases, an environment, a space to expose your ideas and concepts is necessary. Jorge Wagensberg had previously mentioned that no container is suitable for all contents (2005). It is important to know which space suits our reality. This new opportunity for tourism can find its space supported by clouds.

1.1 Project Context

The United Nations 2030 Sustainable Development Goals (SDGs)¹ challenged society, as a whole, in order to work harder and contribute to the sustainable use of biodiversity (including agrobiodiversity) and ecosystems and thus reduce poverty and enhance economic growth opportunities.

Moreover, relevant research projects² have been working to enhance the appreciation of science, biodiversity, and ecosystems raising awareness regarding the links between the knowledge-based management of social-ecological systems, sustainable socio-economic development, and human health and well-being.

The COVID-19 pandemic, has produced consequences not only of a biomedical and epidemiological nature on a global scale but also had social, economic, political, cultural, and historical repercussions unprecedented in the recent history of epidemics (Fiocruz 2020).

The Communication Services sector is probably the only S&P 500 sector (a group of leading companies in the stock market) that might come out of the first-quarter earnings period looking slightly better than most. The travel and tourism industry is one of the largest

¹ <https://sustainabledevelopment.un.org>

² The main driver for this research started by the existence of Biopolis a big research project taking place with Porto University - <https://www.biopolis.pt/en/the-project/>

economic sectors, reaping \$8.8 trillion per year, according to The World Economic Forum WEF (Altschuler 2020, Kinahan 2020).

While it might seem that the concerns of tourism are of secondary importance in the middle of such a global crisis, this may not necessarily be true due to the significant role tourism represents in the economic growth and development plans of many nations (Higgins-Desbiolles 2020). As the graph below shows (Fig.1), the tourism sector has a great percentage of importance in the GDP of several nations around the world.

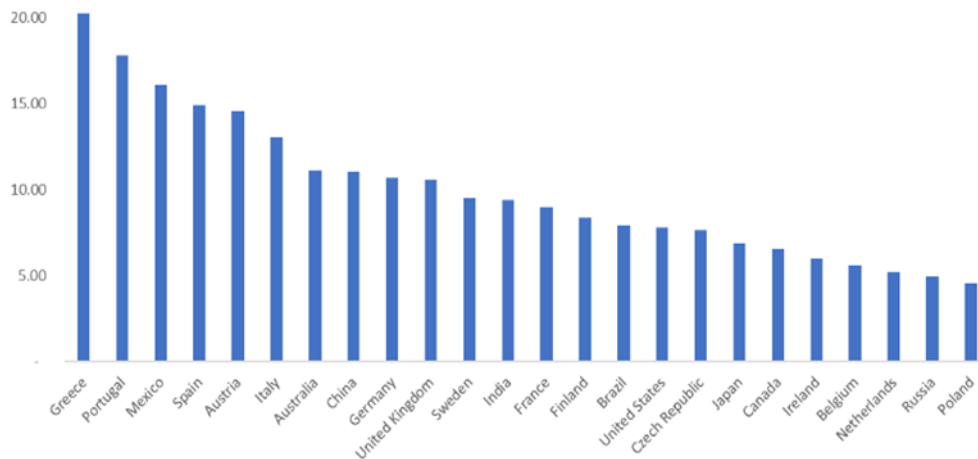


Fig 1 - Tourism Impact to GDP source World Travel & Tourism Council(Fernandes 2020)

The substantial drop in travel affects many world destinations substantially. Evidently, countries such as Greece, Portugal, Mexico, or Spain, which are more reliant on tourism (with more than 15% of GDP), will be most affected by the crisis (Fernandes 2020). On the other hand, tourism that is more connected to nature is also a communication channel for science. In this context, this research aims to explore technology in order to offer educational services online.

This project is based on the use of the technical knowledge acquired through the Master in Engineering of Services and Management, above all, regarding the knowledge of Service Design (SD).

It will also be guided through the research resources of the International Center for Environmental Biology and Research on Ecosystems and Agrobiodiversity, called BIOPOLIS. Biopolis is an ambitious project that created an international science communication network, which encourages the dissemination of knowledge through various partnerships.

The resources, the different stages of development, and conception of a new service focused on Ecotourism and sustainable Agritourism will be explored.

In that matter, it is crucial to establish organized procedures aiming to transform ecotourism into a vehicle that meets the growing demand for online entertainment services, assuming an educational role and exposing good practices to raise awareness of environmental preservation.

1.2 Research Questions

As technological innovation rapidly changes, service experiences and service designers need to leverage technology and orchestrate complex service systems to create innovative services while enabling seamless customer experiences. Facing these challenges, the present research poses the following questions:

How to encourage online consumption of content geared towards ecotourism?

How can we make tangible tourist experiences contributing to knowledge dissemination at the same time?

What are the best practices of online educational services followed by established institutions, such as the largest natural science museums in the world?

Areas of multidisciplinary convergence, such as Service Design (SD), can be especially specially structured in order to promote innovation when there is a great diversity of languages and countless individuals involved in the processes. SD is based on contributions from various fields, including management, information technology, and interaction design (Teixeira, Patrício et al. 2016).

1.3 Research Goals

This project aims to design an educational service, technology-based in the context of ecotourism, aligned with natural sciences institutions.

In order to tackle these goals, it is necessary to understand particularities in this scenario, such as:

- The Ecotourism segment is always demanding for having tangible experiences. Therefore, it is important to create mechanisms to promote motivation and involvement.
- Ecotourism is a tourist practice that proposes carrying out activities in natural environments in a sustainable way. Through the interaction of tourists with natural elements, the possibility of informal learning increases and, consequently, increases environmental awareness. Content developers will have a mission to provide similar levels of learning and environmental awareness to online consumers.
- Educational content will have tools for disseminating knowledge both to consumers and to providers who are partners in the development of research.

In this scenario, trends lead us to the great challenge of developing an approach capable of, at the same time, motivate customers and embrace them in online co-creative experience as well as promote with them environmental awareness through online educational content.

2 LITERATURE REVIEW

Studies have shown that natural history and science museums can contribute fundamentally on monitoring and preventing tropical diseases since they occupy a privileged position to inform public health agents about the natural history and (historical and current) distribution of animals that are hosts and/or vectors of these diseases, as well as its relationship with human communities (Ceríaco and Almeida 2020).

The global crisis has brought into focus the crucially important role that museums play for science and society. The crisis may offer a rare and invaluable chance to rethink and reset tourism toward a better pathway for the future. ‘Responsible’ approaches to tourism alone, however, will not offer sufficient capacity to enable such a reset. Instead, such a vision requires a community-centered tourism framework that redefines and reorients tourism based on the rights and interests of local communities and local people (Higgins-Desbiolles 2020).

Tourism has the potential to recover and once again establish itself as a key part of national economies and a wider sustainable development agenda. This crisis may also offer a unique opportunity to shape the sector to ensure it not only grows but it grows better, with inclusivity, sustainability, and responsibility prioritized (UNWTO 2020).

Given this, this research project presents a proposal to change the service provision paradigm for institutions that communicate science, through the development of an online educational service focused on promoting environmental awareness.

With that in mind, the next stage contains the state of the art of several topics that were considered relevant to sustain an argument and develop a technology-based service.

2.1 Defining Ecotourism

Ecotourism promotes nature-based tourism activities, environmental conservation, and generation of tourism-related benefits to local communities in ecotourism destinations (Lu and Stepchenkova 2012). According to the International Ecotourism Society, this typology of tourism is now defined as is “responsible travel to natural areas that conserves the environment, sustains the well-being of the local people, and involves interpretation and education” (TIES 2015).

Ecotourism is clearly a relevant concept, in terms of “sustainable tourism” and, in principle, seeks to consider tourism activity through various sustainability perspectives - economy, society, and the environment (UNWTO 2016).

Therefore the essence of ecotourism is to assume a sustainable form of tourism based on natural resources that focus mainly on experimenting and learning about Nature, and that is ethically managed, attracting more and more attention from students and academics (Fennell 2014). Ecotourism is seen as the extreme opposite of mass tourism, according to some scholars. However, if sustainable and mass tourism absorbed positive points, mass tourism could achieve scenarios of greater (ecological) sustainable and ecotourism would achieve levels of financial self-sustainability (Beni 2019).

Although everything points towards ecotourism being able to make a positive contribution to the conservation of nature, it is also clear that, if poorly conducted, it can become a new environmental problem, namely when confused with some forms of Nature tourism, which

only explore and degrade the environment, without major or any sustainability concerns (Matos 2003, Oliveira 2009).

Higgins-Desbiolles (2020) offered an analysis using a continuum to illustrate how various reformist interventions promoted changes to tourism processes but were not sufficient to address ongoing exploitation and injustices that tourism has caused.

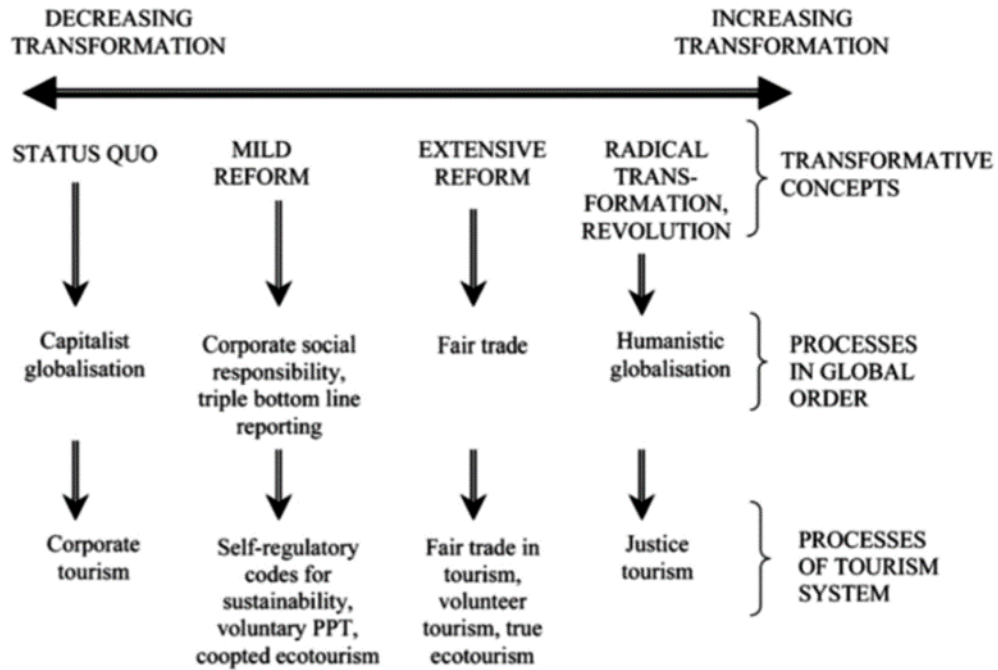


Fig 2 Continuum of transformation possible in global order and tourism system (Higgins-Desbiolles 2020)

However, an ecotourism market segmentation study that evaluates the possible values of ecotourists concluded that the protection of biodiversity is the most important attribute of ecotourism (Zografos and Allcroft 2007).

As Eagles and McCool (2002) warned, it is important to discuss visitor management, including techniques that control and limit the impacts of use, allowing as many visitors as possible within the limits established by environmental and social conditions.

Although ecotourism is an obvious trend in the travel industry, by far not all tourists have a high degree of awareness of environmental protection (Chiu, Lee et al. 2014).

Tourists, due to their presence, result in some degradation of the environment, however small this degradation may be. This presence creates a complex problem: the preservation of forests and nature needs scarce resources provided by ecotourists, whose presence and money can change the ecosystem and society forever (Courvisanos and Jain 2006). Ecotourism and agrotourism have the extremely difficult task of finding a balance between the damage caused by tourists and the continued preservation of the ecosystem for posterity (Buchsbbaum 2004, Courvisanos and Jain 2006).

A study designed and developed a smart application to support young people to learn more about ecotourism in Thailand. The author observed that the integration of digital technology

added to the needs of young tourists, will bring awareness and thereby promote migration of these tourists to practices favorable to the environment (Chai-Arayalert 2020).

2.2 Science museums as service communication providers

Broadly, Natural History and Science Museums are increasingly unique institutions in the world today because they are able to combine historical research accumulated over centuries of specimens' collections and objects with the most modern and sophisticated research tools, and then transform this knowledge into original forms of communication with the public. This increasingly mixes of art and science, provides everyone with unique spaces for contemplation, reflection, and questioning about a planet completely dominated by our species (Rossi-Linnemann and De Martini 2019, Ceríaco and Almeida 2020).

A museum of science is a space devoted to providing stimuli for any citizen whatsoever, in favor of scientific knowledge, scientific method, and scientific opinion, which is achieved by firstly using reality (real objects and phenomena) in conversation with itself and with the visitors (Wagensberg 2007).

Following these concepts, the Hall Of Biodiversity, developed by Jorge Wagensberg, communicates science through offers of interactive content that stimulate the acquisition of knowledge with the participation of the public.



Fig 3 The Hall Of Biodiversity the beauty of the expansive diversification of corn

It is curious that within the physical space, visitors of a science museum have complete freedom to follow their interests and impulses as they move through a public space packed with exhibits all vying for attention without restrictions. This quality of totally unrestricted choice in what to attend to has huge implications for learning in the museum setting (Allen 2004).

Lastly, a museum as a factory of emotions in favor of science has, moreover, a powerful meaning in contemporary society, both if it belongs to a state of law that organizes its communal life democratically and, of course, even more so if it hasn't yet attained such a status (Wagensberg 2007).

Looking to the future, we observe that the Smithsonian Institute (educational and research institution associated with a museum complex) where they are using robots, through Artificial Intelligence, to interact with the public in order to improve the visitor's experience. The idea is that robots start conversations with the public to encourage them to interact and, consequently, facilitate the interpretation of the screens used in some exhibitions (Walch 2020).

The Science Museum, in London, already planned, this year, to present the public with a mixed reality detective experience, with high-resolution 3D scans of robots and other iconic objects from its collection aiming to bring the latest in robotics and artificial intelligence to life. At the Natural History Museum, the dinosaurs in your collection will be brought to life, and visitors will experience the paleontologist's detective work and share the thrill of scientific discovery (ScienceMuseum 2019).

There are also expectations that in the near future, museums will be able to approach/disseminate contents much larger than those that pertain to their collections. Through the adoption of technology, it will be possible to project images, share knowledge, thus increase the variety of content to be disseminated without limiting the collection, location, or even language. Museums will be more integrated and opportunities will arise for the development of large universal cultural centers. The consequence of this is the expansion of knowledge spread on a worldwide scale.

2.3 Online educational services

The effects of the new coronavirus pandemic are not restricted to infected people. In education, 1.5 billion students had their classes suspended or reconfigured around the world. The contingent represents more than 90% of all students on the planet - according to an update carried out by Unesco, the UN body for education and culture (Pujol 2020).



Fig 4 COVID impact on global educational services(Pujol 2020) <https://desafiosdaeducacao.grupoa.com.br/ead-alternativa-coronavirus/>

Nevertheless, over the past two decades, teaching and learning processes have been influenced by technological, instructional, and pedagogical advances (Kavanoz, Yüksel et al. 2015, Chyr, Shen et al. 2017). Nowadays, students’ demands are continuously under transformation because their study habits and learning strategies have already changed due to the pervasiveness of the Internet (Persico and Pozzi 2015). As a result of this educational revolution, many colleges and universities now offer online programs or digital courses (Wei, Peng et al. 2015).

Online learning is now becoming an important and central activity in most academic departments at universities, colleges, and, to some extent, even in school/basic education. Enrollments in fully online courses (ie distance learning courses) now represent between a quarter and a third of all higher education enrollments in the United States (Bates 2018).

Given the rapid growth of online education supported by emerging technologies, online courses are becoming a more popular and viable option for many adult students (Lee 2016).

This scenario requires the ability and willingness to combine technological, pedagogical, and content knowledge (Kavanoz, Yüksel et al. 2015), since obtaining new customers and holding current customers have always been considered as two main approaches in service organizations(Akhlaghi, Amini et al. 2012).

The main focus of the service is on the development of offers that provide the best experience for consumers and consequent results for firms. More and more companies are focused on service value creation through customer-friendly experiences (Patrício, Fisk et al. 2011).

Online learning can greatly help society to gain new knowledge and skills. It offers advantages over face to face learning, as it can be done at the learner’s pace and in circumstances that suit them better. It can also be more easily extended than traditional learning—for fixed costs, unlimited numbers can use the content. It also enables the use of new technologies such as multimedia learning (Walsh, Rafiq et al. 2007).

Many studies have been carried out considering technological pedagogical content knowledge and introducing new conceptual frameworks for the knowledge base that teachers need to

effectively teach using technology. There is a notion that technology integration in a specific educational context benefits from a careful alignment of content, pedagogy and the potential, and that teachers who want to integrate it in their teaching practice, therefore, they need to be competent in all three domains (Voogt, Fisser et al. 2013).

It was identified that the teacher's knowledge and beliefs about pedagogy and technology are interconnected. Active involvement in (re)design and approval of technology-enhanced lessons was found to be a promising strategy for the development of pedagogical educational content (Koehler, Mishra et al. 2013, Voogt, Fisser et al. 2013).

Interactivity has been viewed as one of the most important parts of learners' successful learning experiences in an online learning environment (Fisk, Grove et al. 2008, Wei, Peng et al. 2015).

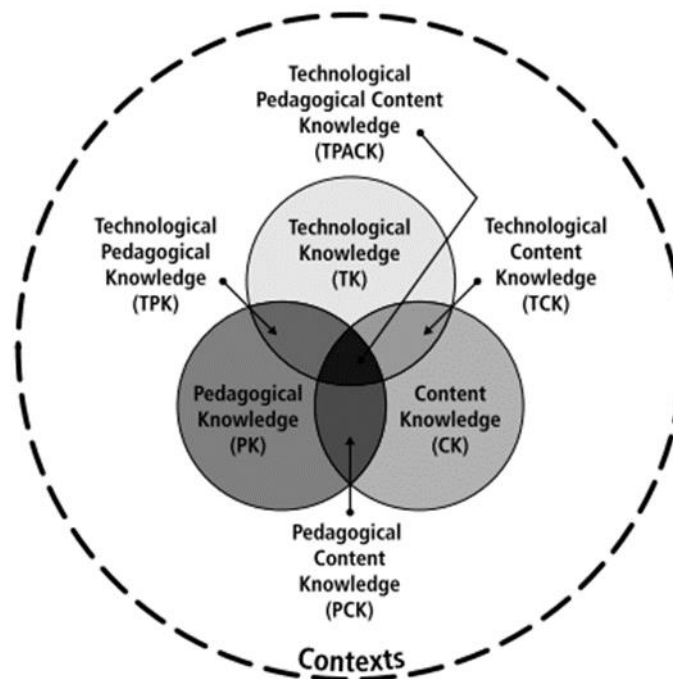


Fig 5 The TPACK Framework and Its Knowledge Components(Koehler, Mishra et al. 2013)

Moreover, improved bandwidth and reduced connectivity costs are making online learning more readily available for everybody who would not have access to topics they want to study (Kapitzke and Pendergast 2005).

In fact, the present circumstance offers a chance to try new ways of doing things - and to question old habits. Are educational institutions prepared to support hundreds of teachers and tutors who move quickly from the face-to-face to the online model? And to engage students in a new learning mindset? (Pujol 2020).

Because the Web combines photos, graphics, text, audio, and video in an interactive environment, it has enabled the design and implementation of virtual schooling. Table 1 below compares the key features of virtual learning services with those of conventional distance education (Kapitzke and Pendergast 2005).

Table 1: Comparison of Distance Education with Virtual Schooling(Lundin, Elliott et al. 2000, Kapitzke and Pendergast 2005)

Distance Education	Virtual Schooling
Geographical distance	Geographical proximity or distance
Asynchronous teaching and learning	Synchronous and asynchronous teaching and learning
Print materials	Electronic and print materials
Time lag	Immediate feedback and instruction
Centralized delivery	Decentralized delivery

To maximize the quality of the online experience and update the potential of alternative learning environments at their institutions, administrators must explore the perceived experiences of their online learning communities members (Roby, Ashe et al. 2013).

While online learning services offer convenience advantages (self-paced) over learning in a traditional classroom environment, there are some inherent disadvantages, such as a lack of face-to-face interaction and the requirement for self-regulation (Lee 2016).

In order to provide effective online experience for customers, the providers must partner to provide appropriate online pedagogical practices, technologies, and support (Roby, Ashe et al. 2013).

2.4 Online Ecotourism?

Will it be possible to offer ecotourism online? For this, it is necessary to understand the meaning of ecotourism.

Eco - expresses the notion of environment, ecology (Priberam 2020).

Tourism - consists of the act of leaving and then returning to the starting point, where the director of this tour is called a tourist (Simões 2020).

Analyzing the meanings of “eco” + “tourism” it is possible to understand that this is a continuous cycle of coming and going with the environment as a scenario.

However, offering ecotourism online is a challenge, since consumers of these services are demanding to live experiences and the question of having nature available on the spot is directly linked to this.

The pandemic circumstance raised many other revolutions beyond education or the exponential increase of telework (Di Domenico, Pullano et al. 2020). Vacations have been questioned as well; thus, it was interesting to find out some offerings considering ecotours. Many museums had to upgrade their offers online and promote virtual access to their exhibitions³.

3 <https://www.cac.es/web/sigoaprendiendoencasa;>

[https://www.nhm.ac.uk/take-part/try-this-at-home.html;](https://www.nhm.ac.uk/take-part/try-this-at-home.html)

<https://museudoamanha.org.br/pt-br/content/baixa-os-livretos-educativos-do-museu-do-amanh%C3%A3>

For many years, museums have been recognized as places for individuals informal learning of individuals, families, and school children. As a consequence, there is a growing interest, worldwide, in the ways museums are used as learning environments, and in the variety of experiences people have in museums (Bamberger and Tal 2007). Given these factors, science museums face a constructivist dilemma as they design their public spaces: the exhibits should facilitate science learning, yet they also need to support a diverse visiting public in making their own choices about where to attend, what to do, and how to interpret their interactions(Allen 2004).

To be effective as teaching tools, exhibits need to be highly intrinsically motivating at every step of interaction in order to sustain involvement by an audience who views their visit primarily as a leisure activity (Allen 2004). Context-awareness techniques can support learners in learning without time or location constraints by using mobile devices and associated learning activities in a real learning environment (Chen and Huang 2012).

The rapid development of wireless network technologies has enabled people to conveniently access the Internet from diverse locations. Additionally, the pervasiveness of handheld mobile devices has transformed learning modes from e-learning to m-learning overcomes limitations of learning time and space (Chen and Huang 2012).

In examining Internet websites for ecotourism, we assume that they do more than facilitate purchases. As it happens with other forms of advertising, they play a relevant role in providing information and shaping perceptions of the places that are being marketed.

A modern museum must favor the provision of stimuli based on the objects and phenomena of reality (Wagensberg 2007). Assuming that the main function of a museum is that the visit brings life change and, as long as visitors have more questions on the way out than on the way in, it's a good sign (Wagensberg 2007).

There is another concept of ecotourism called Ecotours online that offers alternative solutions to traditional tourism. This service aims to create personalized experiences so that tourists can discover the cultural and natural treasures of the countries they visit, minimizing the negative impact of their trip (EcoTour 2007).

2.5 Service Design

Services have been conceived for several decades aiming to qualify their experience, in which the customer has a central role (Pine and Gilmore 1998). This way design for experience-centric services is an important starting point when thinking of tourism.

Service Design (SD) orchestrates service elements such as the physical environment, people (customers and employees), and service delivery process to help customers co-create their desired experiences (Patrício, Teixeira et al. 2012).

In addition, SD is a multidisciplinary field that involves marketing, human resources, operations, organizational structure, and technology disciplines (Ostrom, Bitner et al. 2010).

In order to create new services on contexts related to ecotourism, several design methods can be used, with this, it is worth executing design models that help to save gaps between the problem and the solution (Dubberly and Evenson 2008). For this purpose, it is essential to take into account that services should promote awareness of biodiversity to consumers (Ballantyne and Packer 2011).

Tourism, being a transversal and composite activity, introduced Marketing to its range of research disciplines. This union results in the concept of “Experience Tourism”, with the purpose of transforming the service economy into an experience economy (Beni 2011).

Some studies emphasize the importance of delivering meaning and value in consumer experiences, which requires tourism businesses to connect to tourists in a personal way to not only ensure customer satisfaction but to create a deeper emotional attachment that results in customer loyalty (Tussyadiah 2014).

In the other hand, the SD follows a sequential process in the use of techniques - research of intuitions, workshops, service design, development of service proposals, concept sketches and presentations, prototyping, testing, and delivery of experiences (Polaine, Løvlie et al. 2013).

The Multilevel Service Design (MSD) enables integrated development of service offerings at three hierarchical levels: (a) Designing the firm’s service concept with the customer value constellation of service offerings for the value constellation experience; (b) Designing the firm’s service system, comprising its architecture and navigation, for the service experience; and (c) Designing each service encounter with the Service Experience Blueprint for the service encounter experience (Patrício, Fisk et al. 2011).

The service concept identifies the benefits that the service offers for the customer (Edvardsson and Olsson 1996). Benefits can go beyond services offered internally by firms and include other offerings in the customer value constellation (Patrício, Fisk et al. 2011).

The customer value constellation addresses service offerings and their relationships from the customer's point of view, focusing on services that support a customer's overall activity, regardless of the service provider (Patrício, Fisk et al. 2011).

The service system defines how people, frontstage and backstage processes, technology support, and other elements will be orchestrated to support the service concept and enable a seamless customer experience (Teixeira, Patrício et al. 2016).

At each service encounter, the customer interacts with a concrete service interface, which is a service subsystem that integrates the physical environment, people, and process (Patrício, Fisk et al. 2011).

As Gonçalves (2013) rightly said, just as in the past objects were collected, today experiences are collected. Thus, this study aims to obtain understanding from customers and providers to offer services that best reflect their needs and, consequently, promote the best experiences.

The goal of this project is to promote the best experience for consumers through online educational content. For this purpose, it is necessary to create stimuli for demanding ecotourism consumers.

Museums have the role of inspiring their connoisseurs and directing new paths, including for life. In this way, nobody remains inert after passing by there because they acquire knowledge that stimulates discoveries (Wagensberg 2007). Therefore, this project has the challenge of developing content to potentiate this effect.

3 PROBLEM CHARACTERIZATION

This section details the scope of the Biopolis research project and the biodiversity Hall as potential actors of the researched and designed service solution. Therefore, this research, developed at a distance, was aware of this context and has used it as a framework to explore it in-depth to be able to develop an online educational service design proposal considering this starting point context.

The research unit CIBIO (Research Centre in Biodiversity and Genetic Resources), has a striving research project – BIOPOLIS - currently developed at University of Porto (U.Porto) with an ambitious business plan, since the project aims to establish itself as one of the best international Centers of excellence in environmental biology, ecosystem research, and agrobiodiversity, with the capacity to make important networks and disseminate knowledge, and thus contribute to socio-economic development at the regional and national and international levels (Biopolis 2020). It counts with partnerships with the University of Montpellier (France) and Porto Business School (Portugal).

In parallel, the Biodiversity Hall is the outcome of the union between the Museum of Natural History of the U. Porto and the Science Museum of U. Porto⁴ – that was opened in 2015 with the main mission of constructing and disseminating knowledge about evolution, diversity and the confluence between natural and cultural worlds.

Jorge Wagensberg was the main author of the exhibit design merging concepts of Art and Science and adapting it to explain biodiversity and life in a museum. This way Biodiversity Hall invites its visitors to experience beauty, intelligence, and understanding, all at the same time being the most significative reference in terms of ecotourism offers in Porto city (Grau, Coones et al. 2017, Rossi-Linnemann and De Martini 2019).

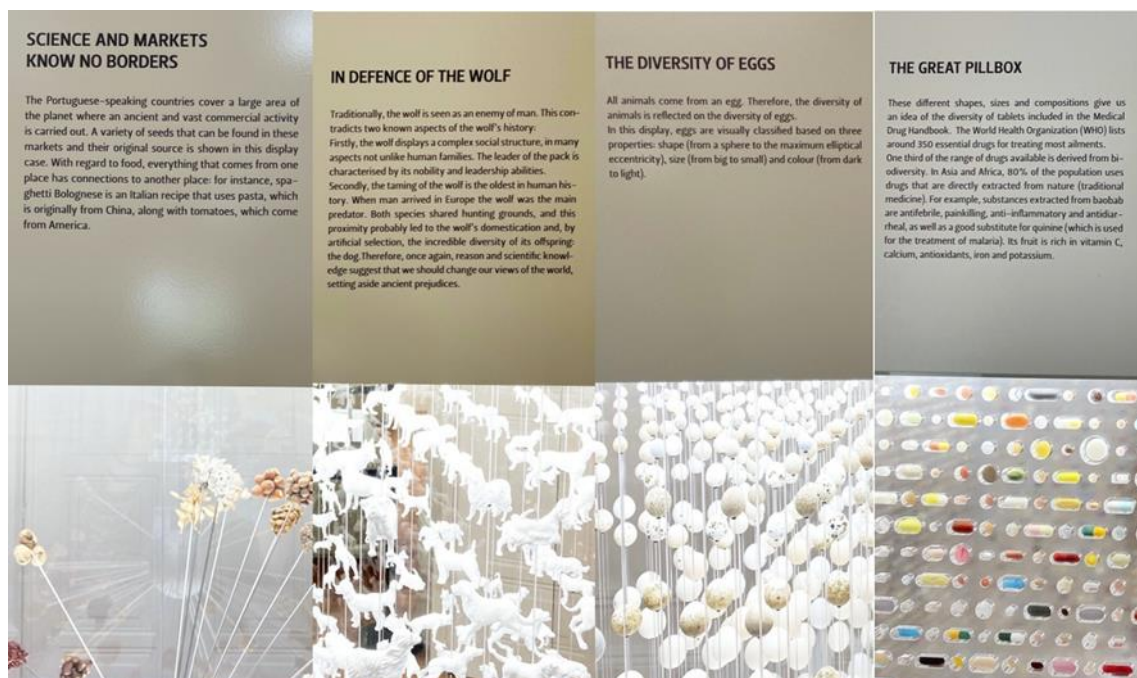


Fig 6 Inside the Hall of Biodiversity showcases exhibit knowledge according to aesthetic, ethic economic and scientific principles

⁴ Faculty of Sciences, the Natural History and Science Museum of the University of Porto (MHNC-UP)

Additionally Biopolis' ambitious project has drawn the attention on important references in the scientific segment. As an example, the well-known Science magazine recently published a report on a discovery made by BIOPOLIS' researchers and promoted it in its cover 5.



Fig 7 Science magazine cover (Novais 2020)

Biopolis research embraces several science segments and has obtained success and recognition for that. Since this study project aims to develop content from different providers in the ecotourism segment, Biopolis becomes a relevant reference and therefore will be a pillar for the development of this research.

The time and space supported the path of this research as well because the Covid-19 pandemic reassures the importance of ideas regarding an online extension of work developed by these institutions as a demanded answer and a natural upgrade. Moreover, as the present thesis is developed at the Faculty of Engineering at the U. Porto it was considered appropriate to envision a more technological-based service offer.

⁵ Biopolis's researchers managed to identify the gene responsible for the difference in color between males and females of mosaic canaries (Novais, 2020).

4 METHODOLOGY

This project intends to design an online educational service in the context of ecotourism. For this purpose, customer experience is a structural element and there are several pieces of research considering it for services' design. According to the service-dominant logic of Vargo and Lusch (2004) customer experience is not designed, rather it is co-created through customer interactions with several service elements.

In order to achieve the desired experience, service designers must arrange consistent clues, along the customer journey (Berry, Carbone et al. 2002). To do this, firstly an exploratory understanding of consumers in this niche market is necessary, then, to study world-class performers and identify best practices and finally, to be aware of how these ecotourism services are facing the paradigm change having so many solutions being provided online. These preliminary studies will support the service design. In addition, a service proposal has been developed which will be detailed below.

4.1 Data Gathering

To achieve the expected results, the study is being conducted by qualitative research supported by the Grounded Theory methodology (Charmaz 2006). This qualitative approach tended, as expected, to be a more open-ended research strategy. However, there was a concern about having an interview guide coherent with the research questions mentioned in the APPENDIX A and B.

This qualitative approach started with an exploratory stage.

Eight exploratory interviews were conducted with open questions, to identify the requirements of the participants and understand their needs, so that experience indicators could be arranged for the development of new services. An online questionnaire sent to service providers related to ecotourism was also used to assess more responses and increase data collection to support this project's development.

1st stage for data gathering

The preliminary data gathering considered 8 interviews conducted through a script containing open questions with potential customers involved, such as ecotourists, biologists, and enthusiasts of the environment, in general. The interviews were conducted in Brazil, in the interviewees' workplaces according to their availability⁶. All interviews were recorded on audio for later analysis.

Despite being a small sample, theoretical sampling was achieved and no new relevant data seem to be emerging regarding the identified experience categories presented below (Bryman 2016).

⁶ This data was collected between March 6 and April 4, 2020. Of these interviews, 6 were conducted in person and in 2 cases, questions and answers were exchanged by email.

2nd stage for data gathering

There was difficulties on obtaining feedback from some important participants of this project and, therefore, it was necessary to expand research to other options. In this way, we assessed information from 50 service providers of cultural, tourist, and environmental activities, in order to obtain enough valuable contributions and experiences regarding the promotion of online educational services (Appendix C). Data from service providers related to ecotourism were assessed through a questionnaire sent by email, mostly, and in some cases, by filling out a standard form on the providers' websites⁷. Online research revealed to be a rich source of data as it has already been witnessed by previous research (Dorsey, Steeves et al. 2004, Bryman 2016).

4.2 Data analysis

The two qualitative studies allowed a deep understanding of the consumers' experience and service providers in the context of ecotourism, with the identification of a rich set of experience factors.

4.2.1 Exploratory interviews with potential users

The first stage of data collection, allowed to classify information into categories that reflect experience components. The experience factors covered several aspects also mentioned by the review of the existing literature. These experience requirements are presented in Table 2.

Table 2 - Categories iteratively analyzed from the 1st stage

Experience Requirements	Category
Awareness	Preservation, Consciousness
Discover	Unexpected Fact, Unique experience
Accessibility	Mobility, Physical constrain
Valued	Knowledge, Interaction, Proximity
Tangibility	Depth, physical evidence

Each dimension presented is supported by the designation of each interviewee, whether individual or institution.

Awareness can be defined as the extent to which customers recognize and know the service. In addition, it is the legacy of the service for consumers that reflects in the preservation of nature, good practices, and conduct towards the environment.

⁷ This data was obtained between April 26 and May 28, 2020. Many companies consulted claimed lack of staff and the need to meet other priorities for a non-response to the questionnaire.

“I try to have good practices to avoid degradation of the environment, such as recycling, energy-saving, reducing the use of potable water.” (Male, Biologist, 33 years old)

“...behavioral issues such as not feeding a wild animal and consequently the activities will fulfill the function of environmental education.” (Female, Biologist, 33 years old)

Accessibility is a facilitating factor for the consumption of services in the ecotourism segment. In some cases, it can be prohibitive.

“The difficulty of access is a major limitation for the public that does not usually perform this type of activity.” (Male, Ecotourist, 40 years old)

“Currently, the price is a limiting factor, as well as mobility for the elderly and disabled.” (Male, Biologist, 41 years old)

When it comes to ecotourism, consumers are dealing with a real environment where they are open to new possibilities. Discovery is a great experience factor, usually appreciated by these consumers.

“The most relevant thing is to have contact with nature as you refer to unexpected contact ... on a trip focused on surfing I got to know the fauna of that place that I was not used to” (Male, Ecotourist, 40 years old)

“In nature, you can be doing a trail and find a puma, in the sea you can come across a shark ... at SeaWorld you already know what you will find, there is no surprise” (Male, Biologist, 40 years old)

Tangibilize is a theme and in order to develop a new service it will be mandatory to find a thousand ways to make it tangible through sound and image. At the Biodiversity gallery, Jorge Wagneberg's work goes some way in this direction to seek to merge with Arts and explain Science so in this sense a new digital based service must also have this concern.

The *Adventure* ingredient is also very strong in this touristic segment, so who enjoys nature likes it because they know, that will be surprised they will face difficulties, but they will breakthrough.

“It motivates me to be in close contact with nature by living away from the center of a big city” (Male, Oceanographer/Ecotourist, 36 years old)

“...it is a type of tourism that involves a very great health benefit, you breathe fresh air, have a deep contact with nature, your immunity improves, your stress decreases...” (Male, Ecotourist, 44 years old)

In terms of the provider's experience, positive aspects were identified that add value to the services. *Value* is associated with the capacity that a service has in adding knowledge, promoting interaction, bringing together, and including.

“...we intensified our online presence and prepared specific content for dissemination and education.” (Museum, Portugal)

“The activity notebooks, which will be available here, contain suggested activities such as games, storytelling, gardening and even changing toys, in order to encourage conscious consumption in addition to sustainable and collaborative practices.” (Museum, Brazil)

These five factors that affect the experience of consumers and providers were identified by analyzing the data collected from 8 interviewed (consumers - participants) and 8 who answered the questionnaire (providers).

4.2.2 Virtual Documents analysis

Then the data analysis from a 2nd stage allowed to identify how these dimensions have been answered by the service providers and find out what can be done to better fit the increased demand of online educational services in the ecotourism field. The content was carried out on websites of other players and service providers to understand the range of services offered to consumers analyses (Bryman 2016).

Bryman (2016) recommendations for virtual documents analysis were considered – authenticity, credibility and representability, however these websites were a source of inquiry and not, in this case, the places they represent – The analysis focused on the typology of service provider, on their approach to covid-19 circumstance, on their offer for educational services and the graphic and interactive solutions.

Table 3 – Service Experience Dimensions gathered from content analyses in 50 websites

Experience Dimensions	Category
Awareness	Influencers Advocacy Didactical resources
Discover	360º experiences, Games
Accessibility	Safety alerts Language facilities
Support	Free or chargeable access to databases Membership Online ticketing Online events (with payed subscription) Online courses
Physical Evidence	Big and colorful photographs Videos, podcasts and other media Interactive tools Downloadable resources

To build this database (Appendix C) also other service providers and experts on arts and natural sciences were considered. Throughout the websites content analysis five dimensions were also ascertained considering tourist services (like museums) in general and often specifically ecotourism and their educational services available. The sample was assembled with service offers from all over the world picking the most distinguished references and potential partners for the case under study (at the U. Porto).

It is notorious that health crisis inhibited these services to operate regularly as the majority alerts to the fact and announces new procedures. However, it is also visible their struggle on having alternative offers online. So, *Accessibility* covers this category, but also the languages available (it is very hard to assess into some websites in Asia).

Support is also an important dimension covering the majority of homepage' apprehensions. Many organizations are closed and beyond being often not profitable they even require conscientious investments (like live animal's care). So many websites alert for financial issues, on their homepage as well.

Awareness to environmental issues is made by several manners being the most common the use of influencers, like sharing expertise. Advocacy is also made through associations and networks for specific causes. There is a lot of didactical resources in spite of not being so common a structured educational service online as this study was carefully looking for.

Discovery' aspects are very hard to emerge from a website but being a demand, it could somehow be found in some gamified circumstances, and the most common is the use of 360° tours.

Finally, *Physical evidence* is well studied and demanded dimension of technology-based services – On these websites it is particularly recognizable the effort on using very realistic colorful and zoomed photographs. There is some investment on videos and live cameras. There are also downloadable and printable tutorials. There is some venture on podcasts but intriguingly there is not much on audio resources as audio can be a not expensive manner to pull user into the real experience.

4.3 Comparative Analysis of Existing Approaches

For Benchmarking the service, the first step was to identify the main providers of ecotourism-related activities around the world.

Considering the list of 50 providers was formed, among which are: museums, zoos, botanical gardens, scientific magazines, and research laboratories (APPENDIX C) previously explained.

In the second phase, it was also necessary to establish comparison parameters between providers. Then, comparison parameters based on facts were defined also considering the functionalities predicted in the new service proposal, such as:

- 360° Tour - this parameter was considered because of the possibility of visualizing a natural environment is a great factor on providing a real experience, making the service tangible.
- Scope of Science - as the new service will be a natural science communication portal, where integration between entities, whether for research or purely service provision, is

promoted, it is fundamentally important to assess how these providers care about scientific aspects.

- Age Range - the goal is to assess whether providers are able to develop content for all age groups.
- Language Coverage - in an increasingly inclusive world, it is essential that providers provide equal conditions to consumers so that everyone can experience their services.
- Service Value - this parameter assesses how the providers of activities aimed at ecotourism value their services.

Combining the providers of activities related to ecotourism with the checklist of features and based on the sites' exploration, the results were:

BENCHMARKING OF ONLINE EDUCATIONAL SERVICE

PROVIDERS	TOUR 360	SCOPE OF SCIENCE		AGE RANGE		LANGUAGE COVERAGE		SERVICE VALUE	
		LOW	HIGH	LOW	HIGH	LOW	HIGH	FREE	NOT FREE
BOTANICAL GARDEN OF RIO (BRAZIL)	✓	✓			✓	✓		✓	
NATURAL HISTORY MUSEUM (ENGLAND)	✓		✓		✓		✓	✓	
PALMENGARTEN (GERMANY)	✓	✓			✓		✓		
TOMORROW MUSEUM (BRAZIL)	✓		✓		✓	✓		✓	
KEW GARDEN (ENGLAND)			✓		✓	✓		✓	
ART INSTITUTE OF CHICAGO (UNITED STATES)		✓		✓		✓		✓	
SAN DIEGO ZOO (UNITED STATES)		✓			✓	✓		✓	

Fig 8 - Benchmarking of Online Educational Service

Botanical Garden of Rio (Brazil) - This providers' main activity is online and consists of an application that allows you to take a 360° tour of the garden with high-quality images. This is considered one of the best botanical gardens in the world⁸.

Natural History Museum (England) - This provider offers a 360° tour that allows consumers to enjoy all the items on display at the museum. In addition, it offers online entertainment services to the most varied audiences, from children to adults. All online services are free.

Palmengarten (Germany) - This provider has reported that it does not have online educational content. However, the website does offer detailed information on several plant species.

⁸ <https://www.timeout.com/things-to-do/best-botanical-gardens-in-the-world>
<https://www.afar.com/magazine/best-botanical-gardens-in-the-world>

Online educational service solution on Ecotourism Context – OAKLAND SERVICE

Tomorrow Museum (Brazil) - This provider has several online entertainment alternatives. Within the scope of ecotourism, they offer online material aimed at preserving the environment, which supports the visitation of the museum. This material is dedicated to children aged 6 to 10 years.

Kew Garden (England) - This provider offers extensive online content through a catalog of species that are present in its gardens. They have their own scientific research laboratory, as well as a journal dedicated to the dissemination of their results.

Art Institute of Chicago - This provider has a complete online exhibition of its entire collection. Online visitation is encouraged as soon as you enter the website. The consultation of contents is offered for free.

San Diego Zoo - This provider offers several online activities, for example, online cameras dedicated to some species. It also has specific online activities dedicated to children in which information on the catalog of species that have a more suitable language is given.

The consulted providers, above all, those selected and that are part of Benchmarking, have several forms of financing explicit on their website. Associations and donations are ways to obtain resources from visitors, in the case of purely online activity, even though online services are not charged. The main source of funds for these institutions is through business partners, or even through public funds and sales of tickets for visitors. Only two providers do not mention fundraising on their websites, such as associations and donations.

5 EDUCATIVE SERVICE DESIGN OF A VIRTUAL NATURAL SCIENCE MUSEUM

5.1 Problem Statement

In the online education business, it was already common to buy products online, such as ebooks, magazines, newspapers, through unit purchase or subscription for a period. Due to the COVID-19, large companies in the streaming business are directing investments to the online education business⁹.

Therefore, the challenge of the project is to create an online educational service in the context of ecotourism, which meets the expectations of a demanding target audience for great experiences. Besides, it has the responsibility to create mechanisms to raise the level of consumers' awareness regarding environmental preservation.

5.1.1 Broad description of the service

Given this new circumstance, it is possible to explore the benefits of technology to offer online educational services towards tourism, considering that it is one of the market sectors that is suffering the most from the crisis. In this pandemic scenario, the value that online content has for a restricted mobility society was highlighted. Ecotourism can be a vehicle to meet the growing demand for online entertainment services, assuming an educational role, and exposing good practices to raise awareness of environmental preservation.

The mission is to find a new approach, yet maintaining the role of promoting environmental awareness to interested people through interactive educational content online.

Service

This service intends to communicate natural sciences to everyone interested in the environment through online educational content. The service aims to eliminate boundaries, take people into research laboratories, tropical forests, botanical gardens, museums, zoos, in order to address sustainable issues, and help natural environment preservation.

Another feature for an ecotourism activity provider may consist on the creation of an identity within this segment, as well as the visibility created by their contents, which can be used to implement upselling strategies for other services and products.

Slogan

The Garden is right here, just look behind the bushes!

5.1.2 Target Market

The service is aimed at two target markets: B2C and B2B.¹⁰ The main target audience at B2C is composed of ecotourists, researchers in natural sciences, and anyone interested in the

⁹ Amazon, for example, signed an agreement with public schools that when purchasing ebooks, they will receive free online teaching material to be used by students from kindergarten to 12th grade.

¹⁰ B2C (Business to Customer) is a model of relations between companies and individual customers. B2C's main tasks oscillate: acquiring a customer - for this reason, the content and appearance of the portal / application must attract attention, guarantee an interactive and friendly interface.

environment. B2B (Business to Business) refers to relations between companies. Many other elements can be added to the chain, such as planning, previsions, storage, production.

The main partners in this segment will be ecotourism and natural science activities providers such as botanical gardens, zoos, natural science museums, and research labs.

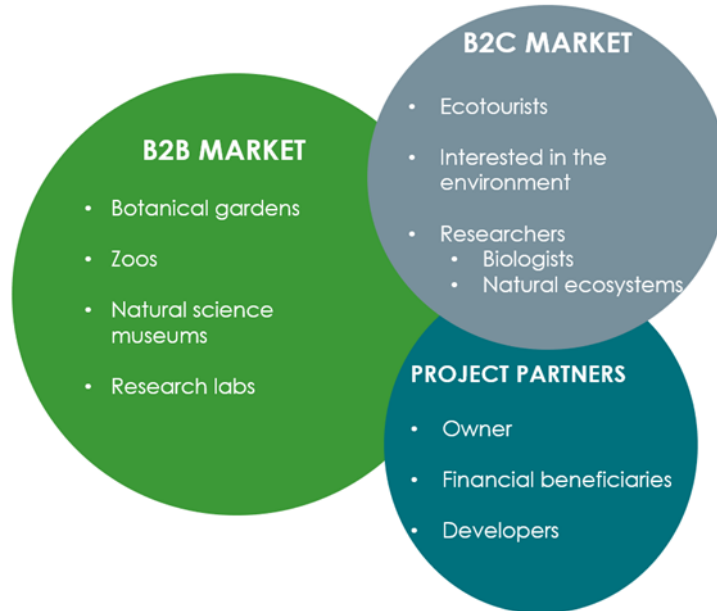


Fig 9 - Actors Map

5.1.3 Benefit Proposition

B2C

The service is based on customer involvement through a database available for analysis of consumers' viewing habits and preferences. This way consumers contribute to the choice of the content themes to be offered.

The benefits offered to B2C customers are:

Variety of content - the ecotourism segment interconnected to the branch of research in natural sciences allows a varied offer of content. Whether following the tide level, details about the development of a survey, or even eating habits of wild animals.

Availability - the service provides access to content 24 hours a day, 365 days a year, being the constant availability one of the main benefits of the service. The consumer can choose when and what to consume.

Awareness of the environment - the essence of the contents is aimed at contributing to the awareness of the environment. It will be possible to live experiences (previously only allowed by immersion) through informative and enlightening content that brings life in natural environments to consumers.

B2B

The benefits offered by B2B include an increase in the number of new consumers, the creation of an identity in the ecotourism segment, and improvement in consumer retention rates. To achieve these benefits, it is important to make investments in website design to

develop a favorable scenario creating an environment (Physical Evidence) that potentiates the demand by consumers, as well as the use of tools to interact with the public that helps to build expectations in them.

Another positive tool in B2B is the use of consumer data to define preferences. Thus, it is possible to list products and other services to be indicated to educational content consumers.

In order to attract other markets, the content will be available in 7 different languages (Portuguese, English, Spanish, French, Chinese, Japanese, and Arabic) as an option for consumers.

By listening to its customers, companies can give the public what they want and find out which activities generate the most financial feedback.

5.1.4 Key assumptions

This study takes the BIOPOLIS project as a reference, and as previously described is a consortium of scientific research, located in Portugal and linked to the University of Porto. This research project invested in a new way of communicating science that aims to promote the translation of research and innovation in applications and business opportunities, through a strong international program of affiliated laboratories (Biopolis 2020).

Another key factor is the paradigm shift that has taken place with the current world pandemic crisis. It is a noticeable fact that more and more people will start looking for solutions online in their daily lives.

Once again due COVID-19 pandemic, there is the factor of reduced mobility among tourism consumers around the world because of restrictions measures imposed by governments such as closing borders, and even establishments that gather large audiences.

5.1.5 Key Constraints

Considering the business proposal, its benefits, and premises, it is known that there are also some restrictions to be addressed. The concept of tourism and ecotourism is not associated with a digital experience. It is necessary to create stimuli. In other words, the development of content focused on providing better experiences and causing increased interest is essential.

This service will exist with the following conditions:

- Consumers have access to educational content through a mobile device provided with access to the Internet.
- The services will be available through access once the consumer has signed up and registered a personal profile account.

5.1.6 Business goals

Business goals are part of a larger process that starts with the vision and mission of a service and ends with specific goals, and action plans that help to move the business forward. Business goals should be SMART (specific, measurable, attainable, realistic, and time-bound) (Lawlor 2012).

The project intends to reach as many users as possible. To do so, agreements with science promoters institutions are a natural way to promote new tools and popularize the service.

In 5 years, the following business goals are defined as:

- Expand agreements for universities and postgraduate courses.
- Increase the number of accesses per month by 100% when comparing to the 12th month of service.

5.1.7 Environmental and Market Analysis

Environmental analysis is a strategic tool. It is a process to identify all external and internal elements, which can affect the organization's performance. The analysis consists of assessing the level of threat or opportunity that factors might represent. These evaluations are then translated into the decision-making process (Pestle 2015).

Identifying major environmental trends

To better analyze the environment surrounding this service proposal, it is necessary to identify the major trends that can affect the normal course of this business activity, therefore, the PESTEL analysis was performed.

PESTEL analysis

Political:

There are no political restrictions in the streaming business in Portugal or Brazil, as these nations have no commercial problems with other nations. However, there are partnerships with research laboratories in several countries, so the dissemination of such content can only be done following the rules adopted by each country.

In the event of a restriction, it is important to ensure that the content available is the same for the entire market offered.

Economic:

Large companies in the streaming market, such as Netflix and Disney, have increasingly invested in their productions. In addition to the high financial return, independent productions have changed the historical trend concerning the premiere of new films that normally took place in cinemas, nowadays it can happen in any home that has the service. The Oscar ceremony itself, which only considered films that had high levels of box office in theaters, currently also award independent productions.

Another fact, countries that have weak currencies against the dollar affect financial results. Local competitors can take advantage of this factor (Frue/Pestle 2018).

Socio-Cultural:

As digital media continues to expand, competition between cable television and online streaming services increases. Acquiring customers today takes more than just advertising; it requires tailoring business goals to the needs and desires of consumers. Customer service is the main driver to customer satisfaction while social trends persuade the adoption of online streaming (Lee, Nagpal et al. 2018).

Technological:

Technology is developing continuously. Its advance has a lot of influence on companies since technological factors increasingly help to know how consumers react to various trends (Pestle 2015). Value creation in the digital age has become a value co-creation between companies and customers, and the emergence of big data has been the main driver for this disruptive change. Through Big Data, companies discover unexpected patterns about customers, businesses, and markets (Xie, Wu et al. 2016).

Another key technological factor is the image quality of the content¹¹.

As a result of this advance in the image resolution of contents, there is a need to adjust the bandwidth limit of Internet service providers to support such demand (Siciu 2018).

Environmental:

For deep-rooted streaming companies, access to data servers has a huge negative impact on the environment. Each of these activities that take place online has a small cost - a few grams of carbon dioxide are emitted due to the energy required to run devices and power wireless networks. Less obvious, but perhaps even more energy-intensive, are the data centers and the vast servers needed to support the Internet and store content (Griffiths 2020). However, large companies like eBay (2014) are already developing projects combining heat and energy to offset the carbon emissions produced through fuel cells powered by natural gas (Gary Cook 2014).

Since 2014, Google's data centers have used 50% less energy than the industry average through the use of highly efficient evaporative cooling solutions, intelligent temperature and lighting controls, and custom servers that use as little energy as possible (Trueman 2019).

Legal:

Content piracy is a growing ROI problem for content owners and distributors worldwide. The digital delivery system makes it easier for pirates to steal and re-transmit illegal content anywhere in the world, using the same type of infrastructure used by the service providers themselves (Ittah 2019). Digital rights management is a common defense solution used to protect against digital piracy. This technology restricts unauthorized duplication of content and enables content owners to enforce licensing requirements (Varsani 2019).

Another solution is to use an invisible watermark embedded in exclusive data in a media file, such as a video, which cannot be seen with the naked eye but can be easily identified by the watermark solution detection system (Varsani 2019).

5.1.8 Value Proposition

Online educational service in the context of ecotourism

- Online service that promotes other services or products
- Strengthening the provider's identity in the ecotourism segment

¹¹ Netflix, for example, determined that all original content should be shot in 4K UHD. The BBC is also using the same technology to broadcast live sporting events Siciu, P. (2018). "Streaming 4K: It's More Than Just About Resolution." from <https://www.tvtechnology.com/news/streaming-4k-its-more-than-just-about-resolution>.

5.1.9 Potential Actors

This study aims to identify potential actors, such as specialists in the ecotourism and agrotourism industry, collaborators in forests and landscapes, or even natural ecosystems researchers (Fisk, Grove et al. 2008).

Target Audience

- Ecotourists
- Researchers (Biologists)
- Researchers on Natural ecosystems
- People interested in the Environment

Project Partners

- Owner
- Financial Beneficiaries
- Developers

5.2 Exploration

This study aims to identify potential actors, such as specialists in the ecotourism and agrotourism industry, collaborators in forests and landscapes, or even natural ecosystems researchers.

In this phase, interviews and observations were developed to identify the needs of the actors and opportunities for the development of new services (Bryman 2012).

The data collected through interviews and observations works as a basis for modeling the customer experience, by mapping the customer journey during the consumption of the service.

With this mapping, it will be possible to identify all points of interaction between the customer and the service providers.

5.2.1 Researching for the Customer Experience

It is necessary to observe customers in order to identify consumption habits and demands and design in a co-creative process. Services should only be created once it has identified promising consumers.

In order to better understand the customer's experience an in-depth analysis of the qualitative data gathered through the questions to potential customers involved, such as ecotourists, biologists, and enthusiasts of the environment in general (presented in the Appendix A). Additionally, through the semi-structured interviews, performed online and also analyzed, we can assume that providers of ecotourism and agrotourism activities are lacking with information to the consumer about the restrictions for the practice of such activities (Appendix B).

Hence, a Portuguese' providers of services focused on the Environment, Culture, among other aspects, have a fundamental role in contributing to the dissemination of information that increases its costumers' awareness about the use of the environment.

5.2.2 Modeling the Customer Experience

Personas

A “Persona” is a character created as a fictional representation of an actual user and they are used to drive design decisions by taking common user needs and bringing them to the forefront of planning before the design has started, moreover it provides the team with a shared understanding of users in terms of goals and capabilities(Tech 2016).

We performed the modeling of three personas, in order to better exemplify the profiles of potential consumers, taking as a reference the samples obtained in the data collection phase. The created user models (personas) will serve to simulate the consumers' experiences through the customer's journey.

To create the personas the first step was to understand what type of information is needed in order to have a rich character, with enough useful information. The information was divided into 3 categories: (1) About (demographic information and occupation), (2) Needs and Aspirations (characteristics), and (3) Pain Points (difficulties related to the experience of accessing online content).

Customer Experience Modeling (CEM) is a model that systematizes customer information to support the creation of the service concept (Patrício, Teixeira et al. 2012). Modeling the customer experience is based on the needs and desires of the personas concerning the consumption of ecotourism services, what they are looking for, and what systems and artifacts they need to access the content. The above presented profiles were designed considering inputs gather from the interviews with potential users¹².

The summary of personas' characteristics is described below – these characteristics will be used with other tools of CEM in order to better achieve their customer experience requirements.

The summary of the customer experience personas is described below.

Manu:

Her influencers are parents, teachers, and classmates. The most critical experience for Manu is to find information from reliable sources and in an integrated manner. The main activity for her is searching for complementary knowledge about the environment due to the lack of classes as a result of the COVID-19 pandemic. Her artifacts are mobile devices, the internet, and online search engines.

João:

His influencers are co-workers, friends, and family. The most critical experience is the lack of time to seek information about ecosystems. He is very curious about fauna and flora and usually plans his vacation to enjoy natural environments. The main activities for him are

¹² An 8-year-old child was interviewed to better understand her preferences.

the search for ecotourism content and the desire to live new experiences. His artifacts are mobile devices, the internet, and online search engines.

Chun Li:

Her influencers are friends, neighbors, family, and co-workers. The most critical experience for her is to break the language barrier when searching for articles online. Her main activity is to look for visual ecotourism content for dissemination to her students. Her artifacts are mobile phone, internet, dictionary, and websites for articles searching.

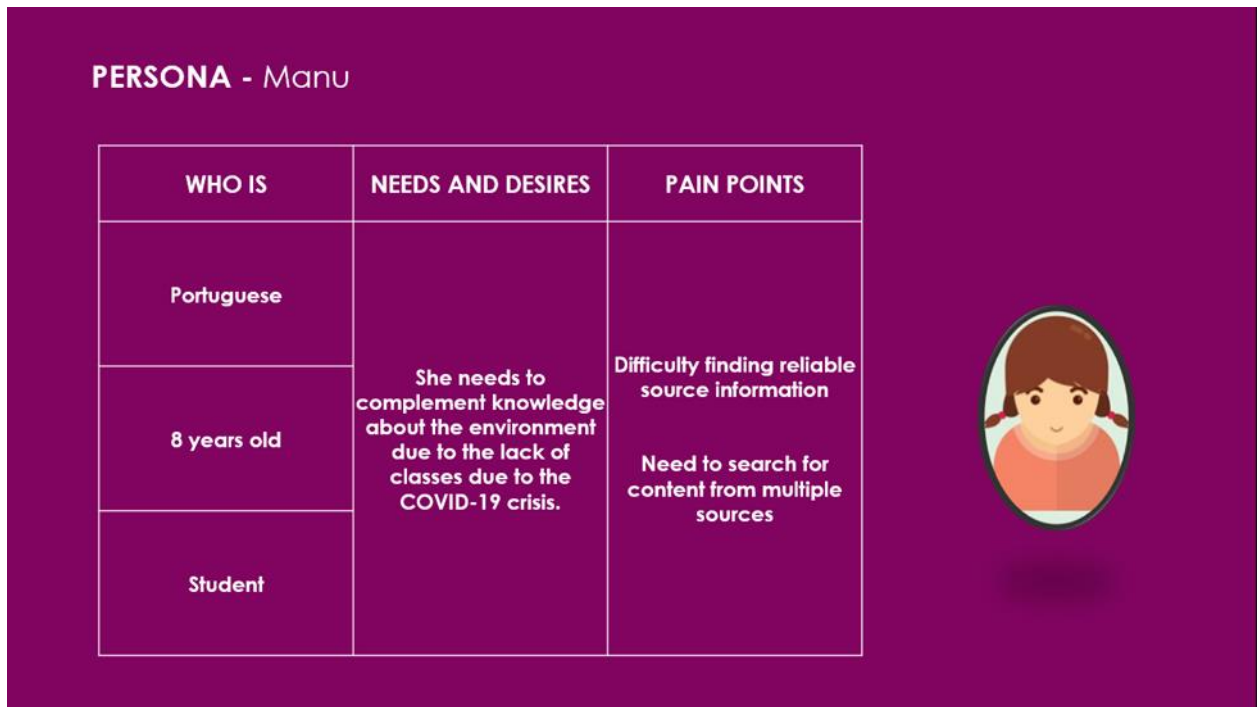


Fig 10 - First Persona

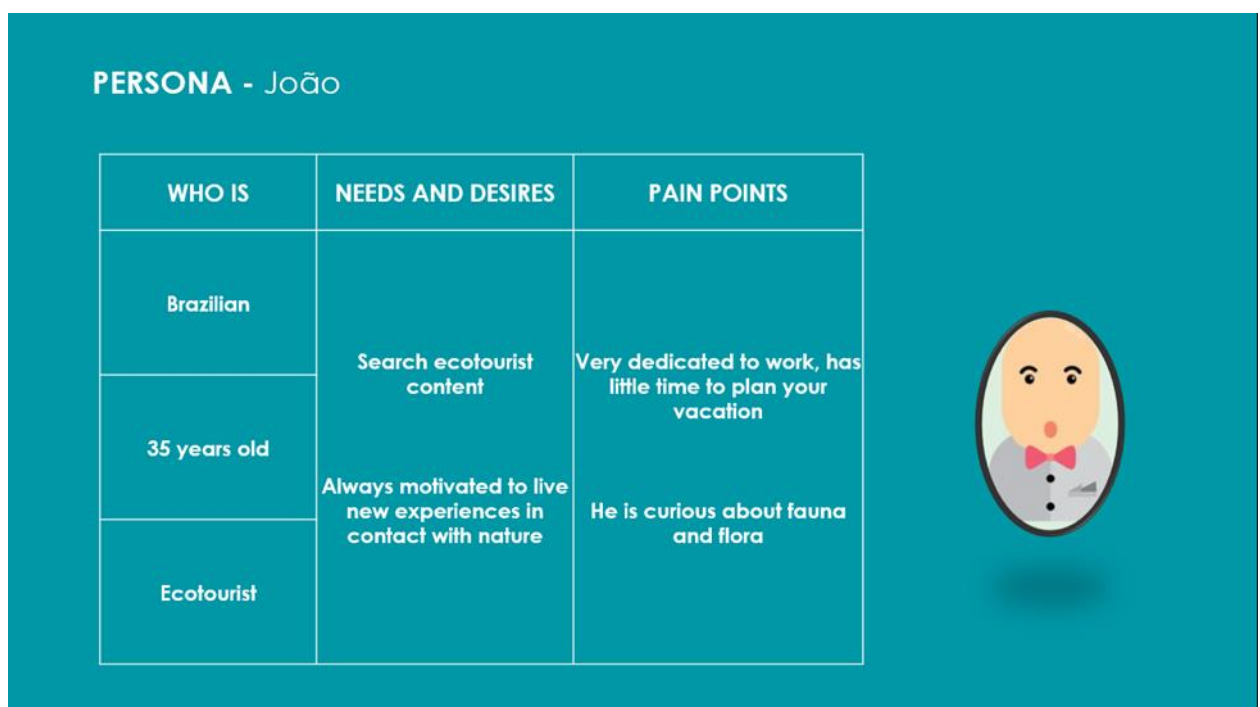


Fig 11 - Second Persona

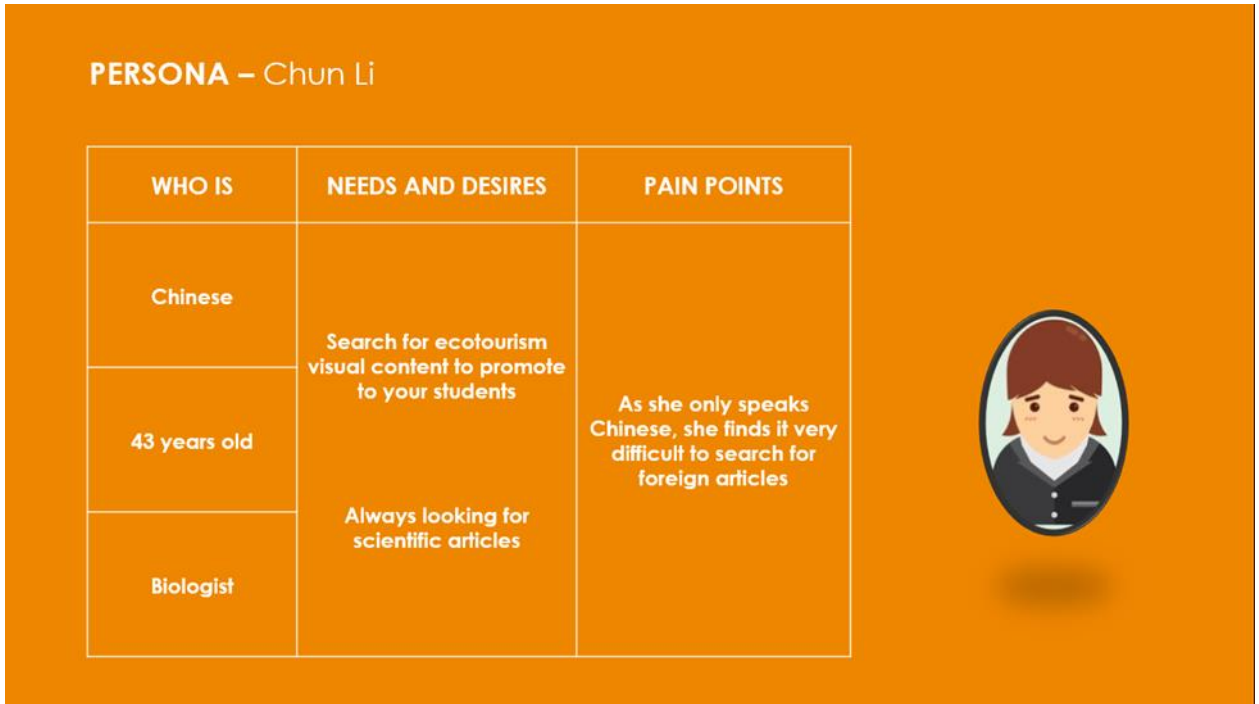


Fig 12 - Third Persona

Customers nowadays interact even more with firms through various touchpoints in multiple channels and media, so these changes require firms to integrate multiple business functions, in creating and delivering positive customer experiences (Lemon and Verhoef 2016).

To enable the desired experience, service designers must assemble a coherent set of elements, or clues, along the customer journey (Berry, Carbone et al. 2002).

We simulate the consumer journey 'As Is' based on personas, to understand how is the relationship with the users of the service offerings. From this, in agreement with the SD, we will offer the best experiences to the consumer.

Assuming that a customer journey among other aspects: Represents the journey of the customer along the different touchpoints or interactions with the service. Define channels and touchpoints: Map out and label the times where the customer interacts with your business (types of channels); It Defines the experienced drivers that make a difference for the customer along the journey; The journey for most of customers is unlikely to be linear. Consider a set of “persona journeys” which cover the main customer segments we have.

Based on the information collected in the interviews, observations, and research, three journeys of the client 'As Is' were created, one for each character: Manu, João, and Chun Li. Customer journeys were created based on a notation in which each point of contact (represented by the full circle, are points of interaction between the customer and the service), pain point (represented by the empty circle, are points where customers have bad experiences) or Driver (represented by the “plus” sign, are experienced drivers that make the biggest difference for a customer).

The first persona search for content for her science class but face it is not easy to do, because she needs to check information in some websites for have certain about the correct content.

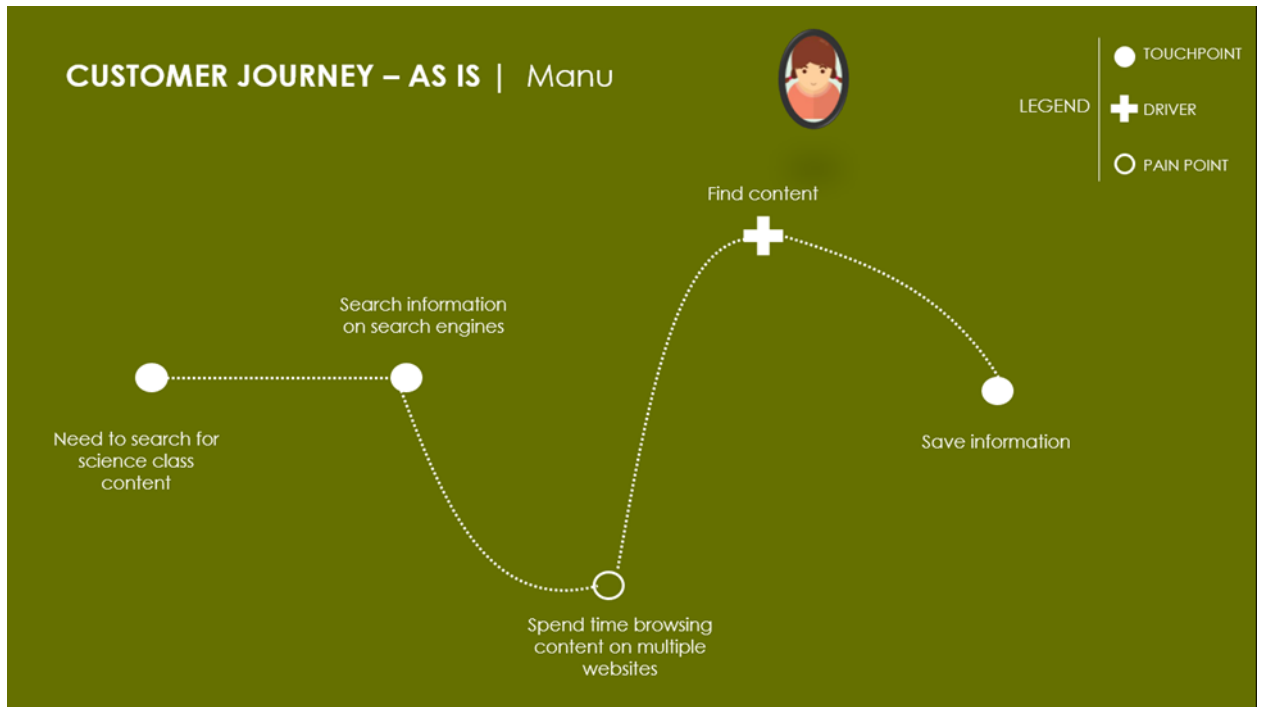


Fig 13 - Customer Journey As Is - First Persona

The second persona enjoy experience in natural environments so he seeks to know curiosities about new places in order to visit them. In this task, he does not always find enough information.

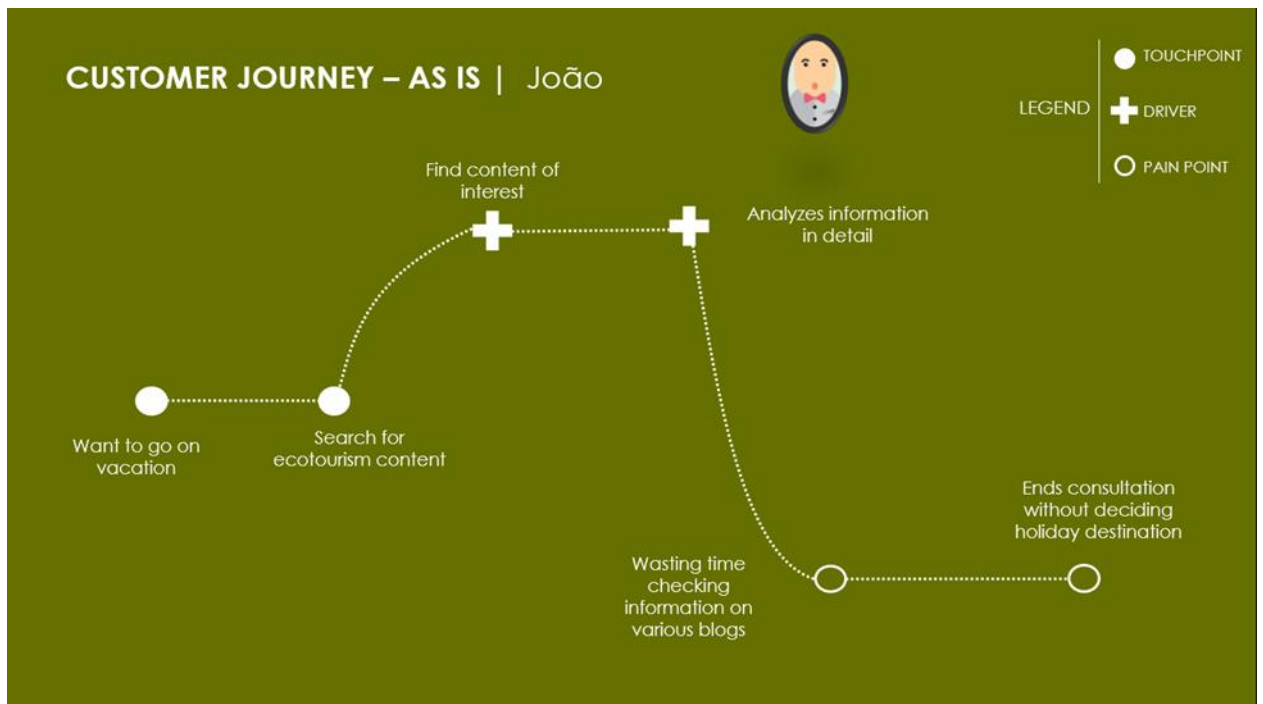


Fig 14 - Customer Journey As Is - Second Persona

The third persona wants to introduce new content to their biology class. However, it is hard on searching content in other languages and thus it wastes a lot of time to find the desired content.

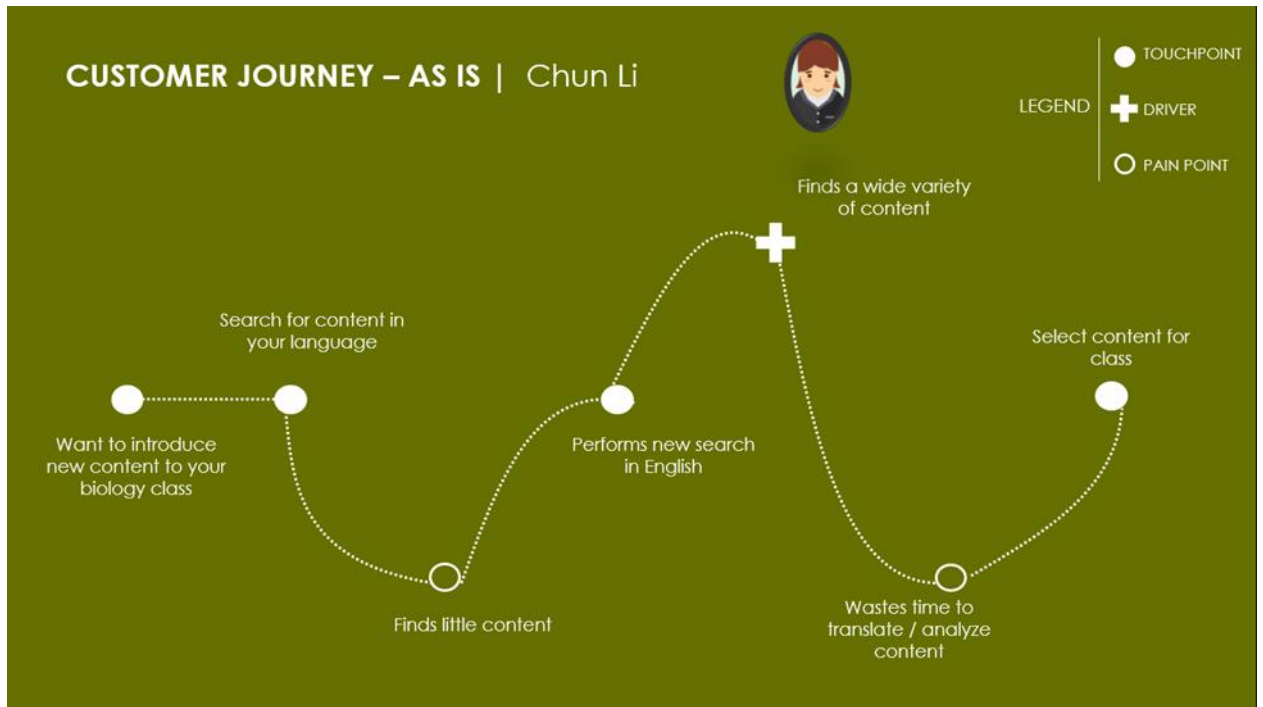


Fig 15 - Customer Journey As Is - Third Persona

5.3 Ideation

At the end of the exploratory phase, we worked on the information from the state of the art and the interviews, resulting in a mental map that served as support to design the service.



Fig 16 – Service Ideation Stage

The Service Concept has the image of an Oak tree as background. So, the name of the service was chosen to be Oakland, because its Portuguese translation refers to an important symbol of this tree for Portugal. Carvalho is one of the most iconic native trees in Portugal (Carneiro 2014)¹³. The large tree branches are different service offers.



Fig 17 – Oaktree at the Biodiversity Hall

5.3.1 Customer journey 'To Be'

The 'To Be' customer journeys were created to understand how the customer experience can be enhanced using Oakland. Three journeys were developed, based on the profile of the interviewees and main consumers. The goal is to portray the ways of consumers' contact with the main solutions presented by the service. We also identify how consumers seek or get to know about the service.

The main points consumers contact with the service offered by Oakland were mapped, aiming to offer solutions that provide the best results, that is, the best experiences.

Oakland presents its contents classified into 6 groups Breathing, Moving, Feeding, Learning, Researching, and Discovering, and thus proposes that the contents reflect tangible experiences to consumers.

The first persona is 8 years old, so it is natural to have support from family members when accessing the app/website. Manu wants to find reliable content that complements the scope of lessons reduced because of the pandemic. After consulting at Oakland, in addition to obtaining the desired information, her curiosity is heightened when accessing various video content. Another positive point is that once selected, the content will be available on her profile as soon as she returns to Oakland.

¹³ The Oaktree is often referred in Sofia de Mello Breyner Andresen books. Sophia's grandfather bought Quinta do Campo Alegre, now known as the Porto Botanical Garden, where she lived and this place was a source of inspiration to her. The Oaktree is mentioned several times on her books for children.

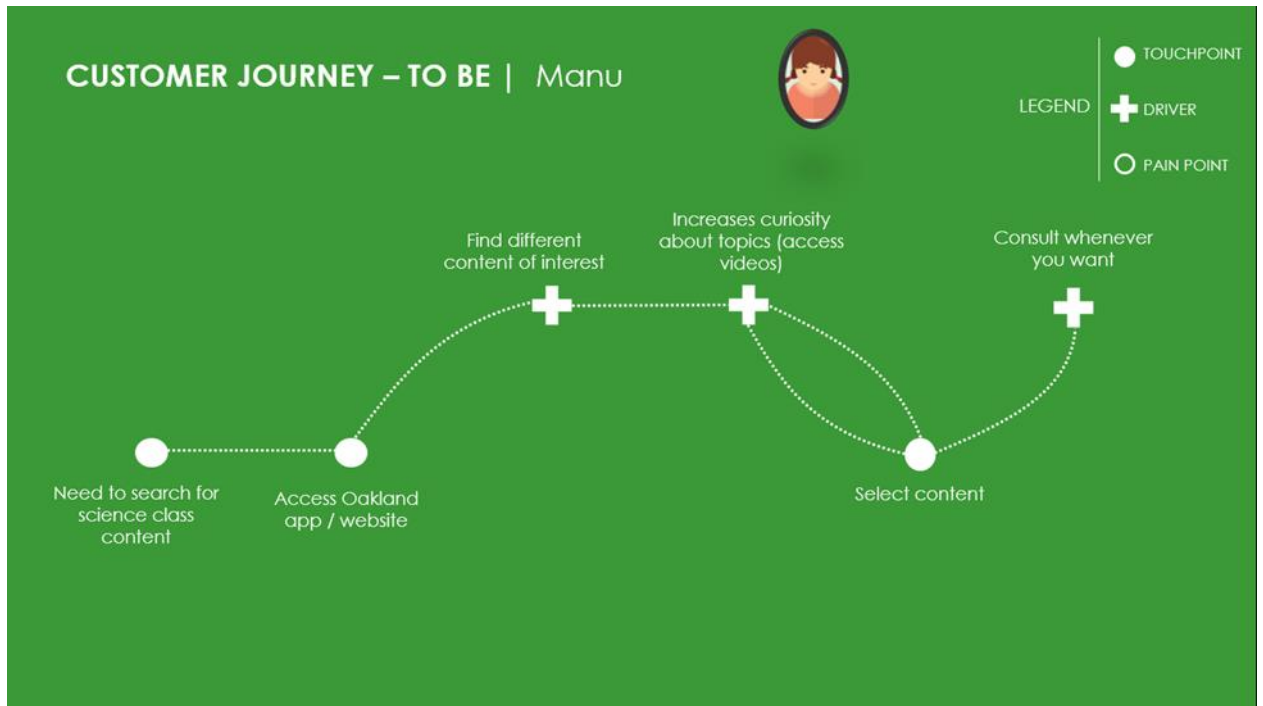


Fig 18 - Customer Journey To Be - First Persona

The second persona has an interest in ecotourism content, which is why he likes to live new experiences. After registering the user's profile, this persona informs his preferences to Oakland. From there, Oakland will send alerts to João as soon as he makes available new content aligned to his interest.

In this case, the persona is encouraged to explore the contents and has a positive experience to the point of defining their destination for a vacation. And after the event, it provides the best photos of the natural environment on the portal to be acquired by anyone who wishes.

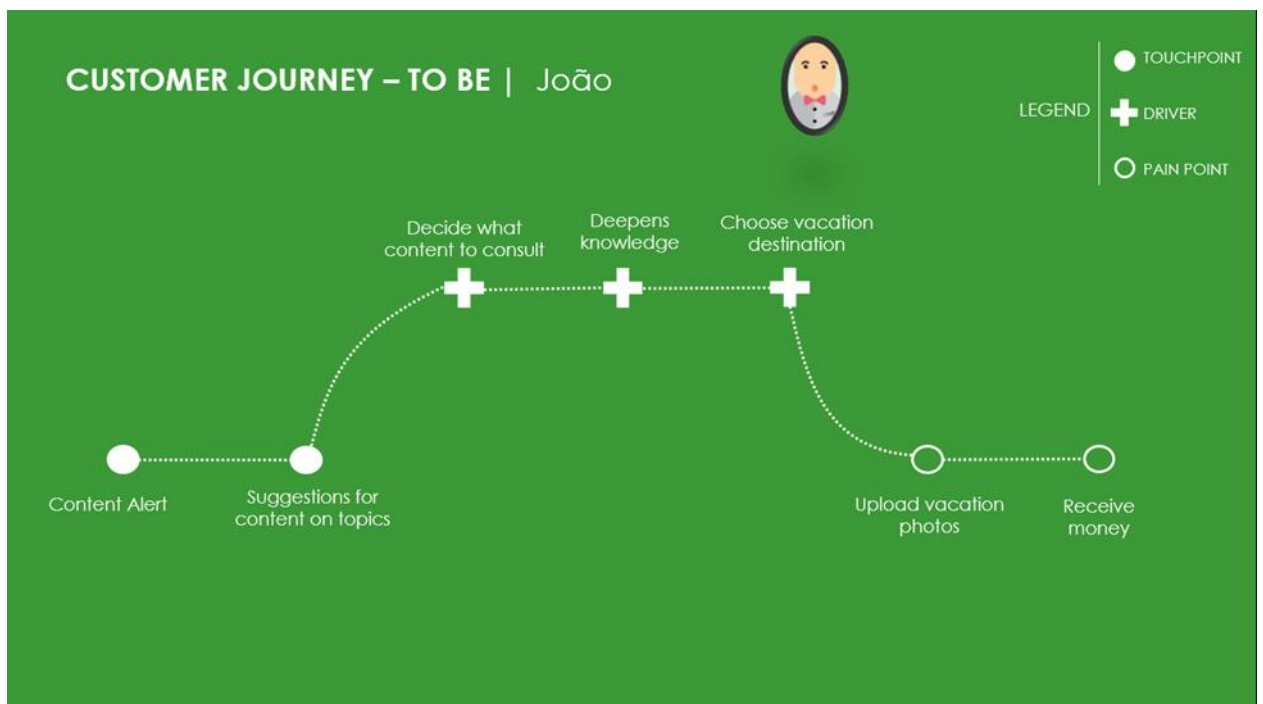


Fig 19 - Customer Journey To Be - Second Persona

The third persona looks for ecotourism visual content to use as a tool in his biology classes. However, he faces the language barrier to locate scientific articles. Oakland assists this persona in this task, offering 7 different languages (Portuguese, English, Spanish, French, Chinese, Japanese, and Arabic) as an option for its consumers.

Once the language barrier is removed, this persona has access to all content available in the preferred language and, as desired, locates content and acquires images to be disseminated to his/her students.

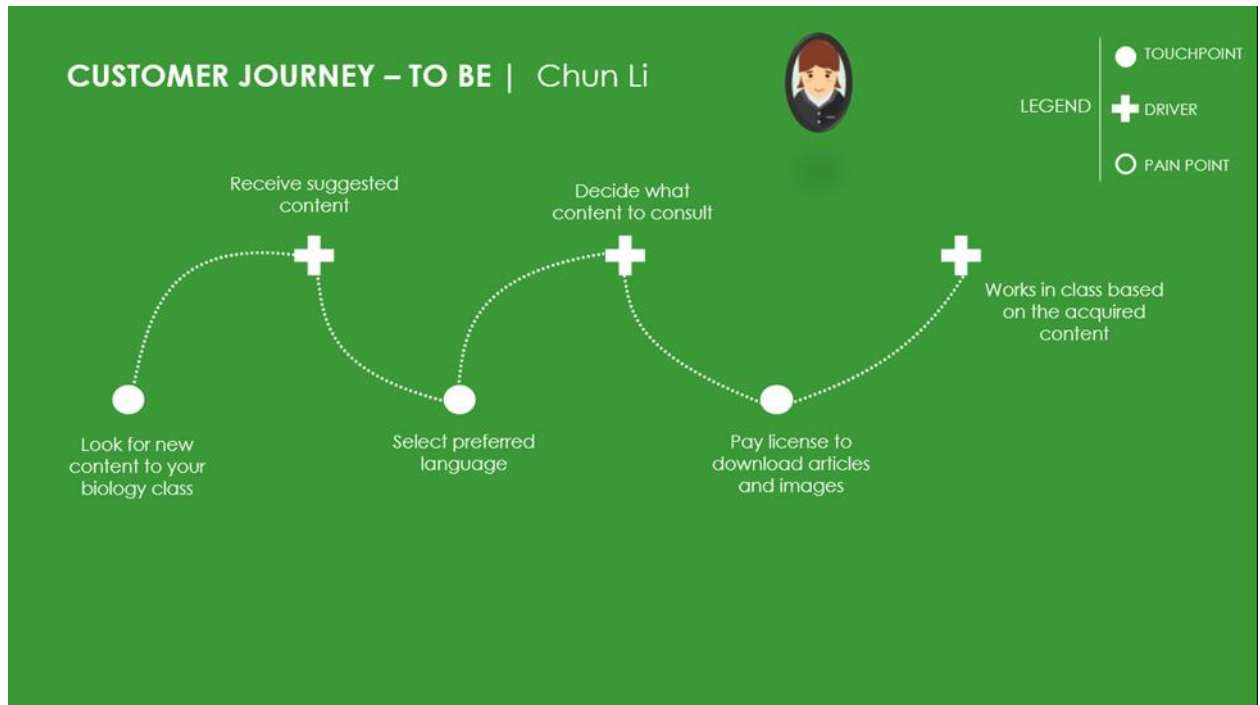


Fig 20 - Customer Journey To Be - Third Persona

5.3.2 Multilevel Service Design

Following the development of SD, Multilevel Service Design was used as a design development tool. To better understand the service offerings, Customer Value Constellation was created to compare the services currently offered with the new services offered by Oakland. The system's architecture and navigation were also developed to offer a more dynamic service to the consumer. The Service Blueprint was used to illustrate the proposal for the new service, detailing the service meeting.

5.3.2.1 Customer Value Constellation

We present the Consumer Value Constellation to better understand the universe of offers in the market segment that Oakland intends to offer.

The Oakland service value constellation is divided into two sections: services currently offered by current suppliers in the market and the Oakland service proposal.

The current situation: it presents the existing services offered by content providers, such as museums, botanical gardens, zoos, and research laboratories. Museums, botanical gardens, and zoos offer their services through exhibitions, tours, campaigns (based on events), and workshops (interaction with the public). Research laboratories present their services through technical reports that disseminate research results.

The Oakland service: helps the consumer experience in the context of ecotourism considering the enunciated aspects:

- **Distance elimination:** breaks logistical barriers. The service will bring knowledge and information from anywhere in the world to anyone who wants to consume content regarding the context of ecotourism.
- **Language options:** breaks barriers of language and culture. The service will be available in 7 different languages (Portuguese, English, Spanish, French, Chinese, Japanese, and Arabic) to bring content to the largest amount of consumers.
- **Integrated information:** the service will be offered on an information and knowledge portal that will contain content on various topics within the scope of ecotourism. The contents will be produced by different providers in the specialty of each one.
- **Partnerships:** partnerships will be the main gears for the service to function. Content providers will be encouraged to produce content, as they will have a financial, image, and recognition benefits at a level never reached in this segment.
- **Disclosure:** the portal will work as a marketing tool, as it will consist of a content showcase focused on the ecotourism segment. It can be used to relate other products and or services from each provider.
- **Research results:** the portal will be a great ambassador for research in the ecotourism scenario, as it will bring results in this segment to the public.
- **Awareness:** the flag of this service is the ability to raise awareness among consumers. The contents will be focused on promoting sustainable strategies for environmental preservation.
- **Campaigns:** the portal will be a great tool to host campaigns, whether focused on events related to environmental sustainability or even for noble causes.
- **Support:** the portal will be a bridge between charity campaigns and consumers.

The Oakland service aims to offer information integrated in a single portal that houses the different service activities in the ecotourism and research segment.

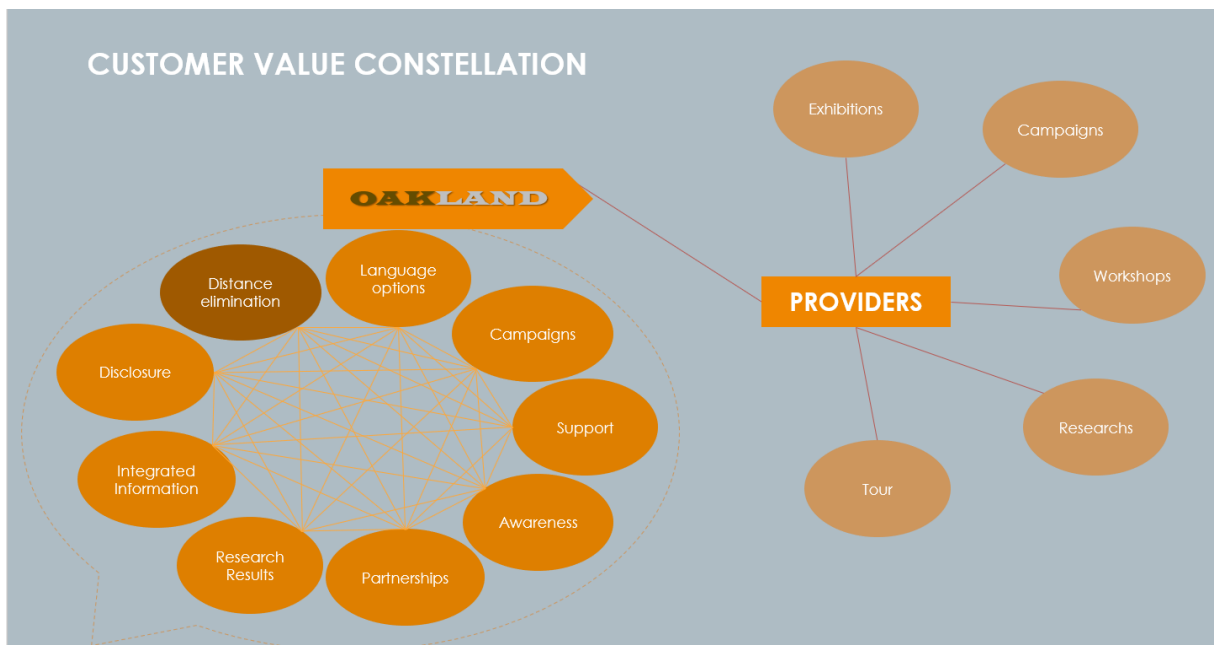


Fig 21 - Customer Value Constellation

5.3.2.2 Service System Architecture

We define the service architecture system to understand how users, providers, system interfaces and other elements can be managed to provide the best experience for consumers.

According to the services offered in the Oakland value constellation, distance elimination was chosen for in-depth detail. The service architecture and service navigation represent the distance reduction between the user and attractions around the world.

The actors within service architecture are customers, website/app, providers, and back-end system. The workflow starts with content creation, content upload, website/app access, content definition, and access to content.

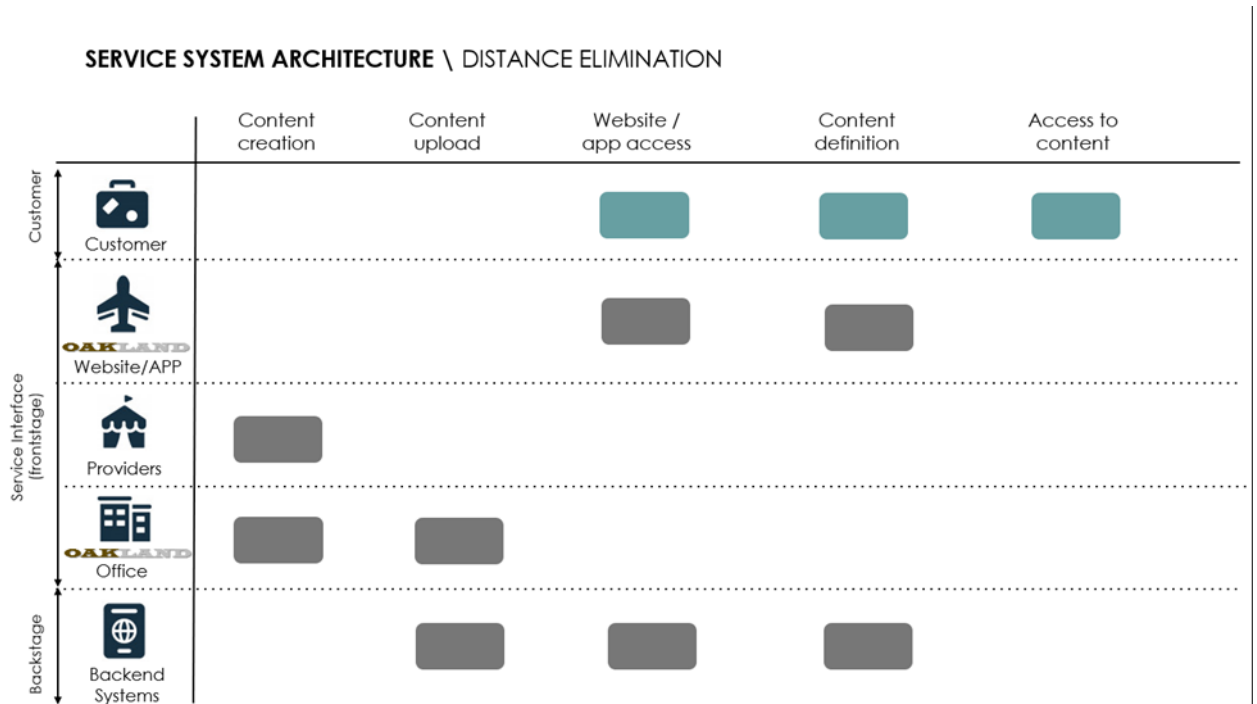


Fig 22 - Service System Architecture - Distance Elimination

Service System Navigation

The service system navigation was developed to consider the various possibilities of interaction between users, system interfaces and other Oakland portal actors, in order to improve the experiences in these processes.

Distance elimination was selected for details because it is an innovative goal and to build bridges has a positive impact on customer experience.

This service is supported by the work of content generation (providers) and editing (design team itself) that feeds the portal with the best content intended to increase knowledge and awareness without geographical and reduced language boundaries.

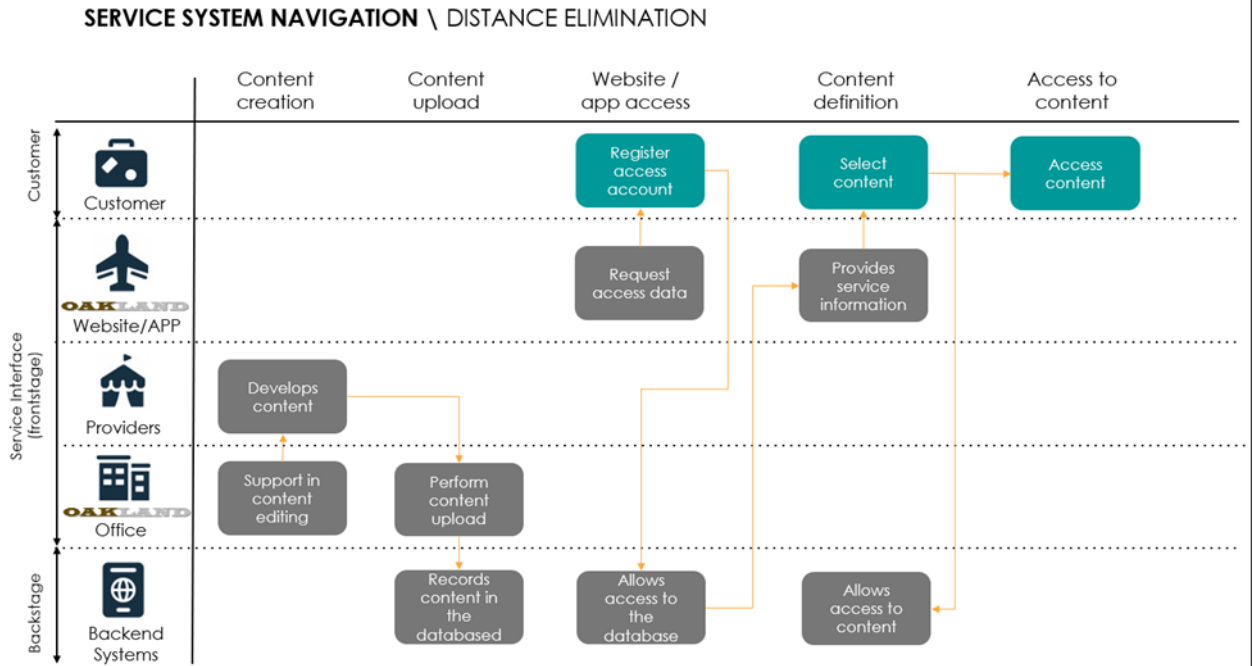


Fig 23 - Service System Navigation - Distance Elimination

Service Blueprint

Service Blueprint externalizes the degree of interaction between the most diverse activity providers with the Oakland team to better define the content to be made available.

For the Service Blueprint, following the service offered from “Distance Elimination”, two main phases were chosen for mapping: (1) Content Creation and (2) Content Definition.

Based on the main ideas of the features that Oakland could offer, the Service Blueprint for "Content Creation" shows how the contents will be developed to be published on the portal.

SERVICE BLUEPRINT \ CONTENT CREATION

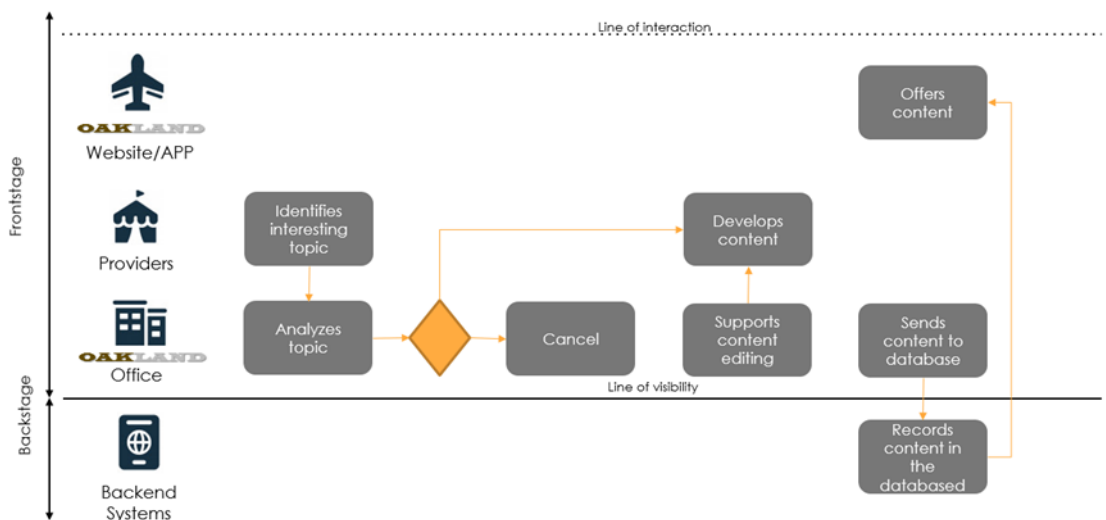


Fig 24 - Service Blueprint - Content Creation

For the Content Definition activity, the consumer will be able to directly search for the desired content using its respective search button or even be encouraged to identify content through 6 different topics.

SERVICE BLUEPRINT \ CONTENT DEFINITION

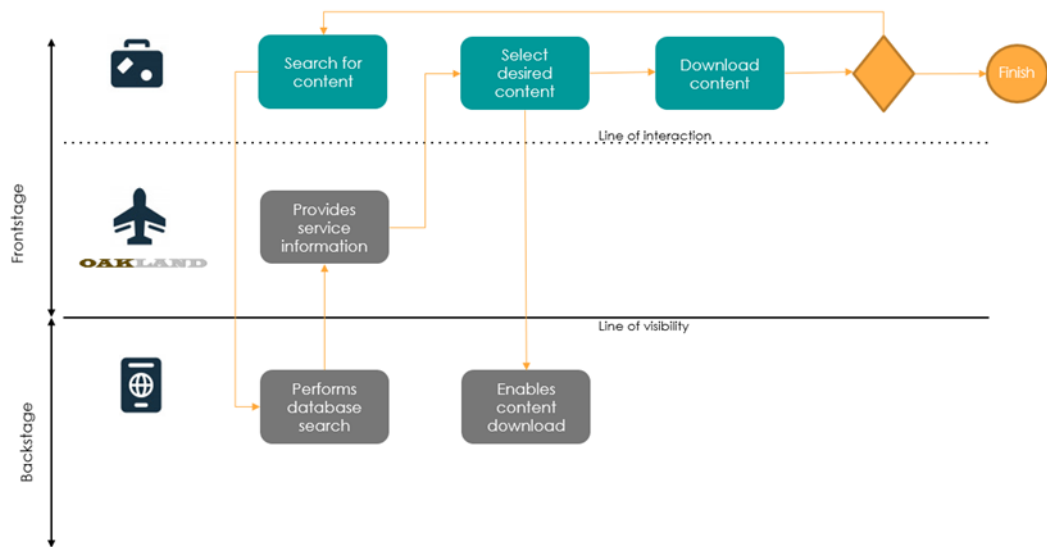


Fig 25 - Service Blueprint - Content Definition

5.4 Reflection

A prototype embodies the typical exemplar of a category and, as such, serves as a basis for judgments about category membership (Sternberg and Horvath 1995).

The prototype of a service contribute to the understanding of how experience is evaluated and particularly how experiences become more tangible supporting the service design in the mobile context(Sarmiento 2013).

The final prototype of the service is presented with a combination of models from the Oakland portal that aims to provide consumers with the best way to explore content in the context of ecotourism, with the help of technology.

First, the name of the service was chosen Oakland, because its Portuguese translation refers to an important symbol tree of Portugal. Carvalho is one of the most iconic native trees in Portugal (Carneiro 2014).

The first screen presents the requirements for registration and access to the portal.

The second screen shows the main menu where the contents were placed under categories created to differentiate the themes to be explored by consumers. 6 categories were created, which are:

- **Breathing** – represents the entire natural flora present on planet earth. Its main goal is to inform activities, events, and all the sustainable way that involves them.

- **Moving** – represents all rivers and oceans and ecosystems impacted by them. Protectionist measures and activities that inhibit pollution will be explored.
- **Feeding** - represents all the fauna that you find on our planet. Being free animals, present in zoos and even those sheltered by projects that aim to eliminate extinction.
- **Learning** – represents all forms of tourism activity that is based on science and historical records in order to promote information that contributes to consumers' environmental awareness.
- **Researching** – represents all laboratory research that somehow presents solutions that benefit the preservation of the environment.
- **Discovering** – it represents facts and information on little-explored subjects and aims to bring up new questions about sustainable ways of life.

Screen 3 presents the contents within each category. There it is possible to browse similar contents.

Screen 4 presents a content view. The design shows an image that represents the chosen activity with a short text.

Screen 5 is the continuity of the previous screen when dragged down. In this, there are videos available and the possibility of access to scientific articles associated with the supplier, as well as images to be negotiated (upload and/or download).

The first version of the prototype was developed in a short time. However, this version was tested and evaluated by 4 individuals: a graphic designer, a biologist, a manager and an 8-year-old student.

The interviewees were satisfied with the presentation of content in topics, on the other hand, indicated that the design could be improved.

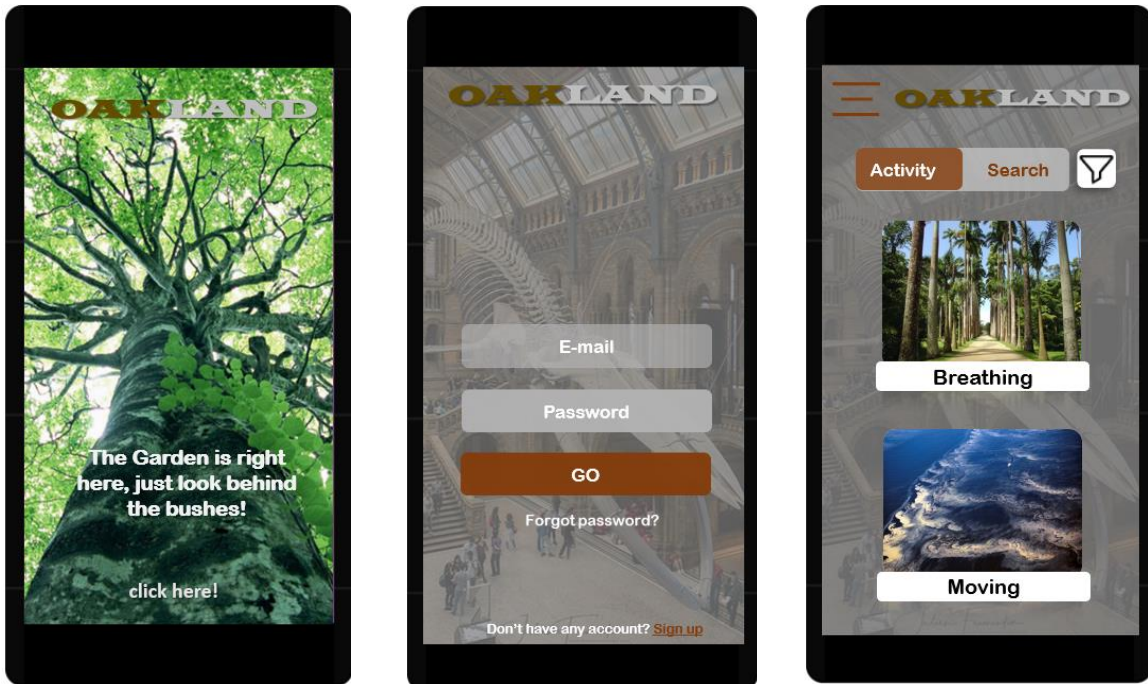
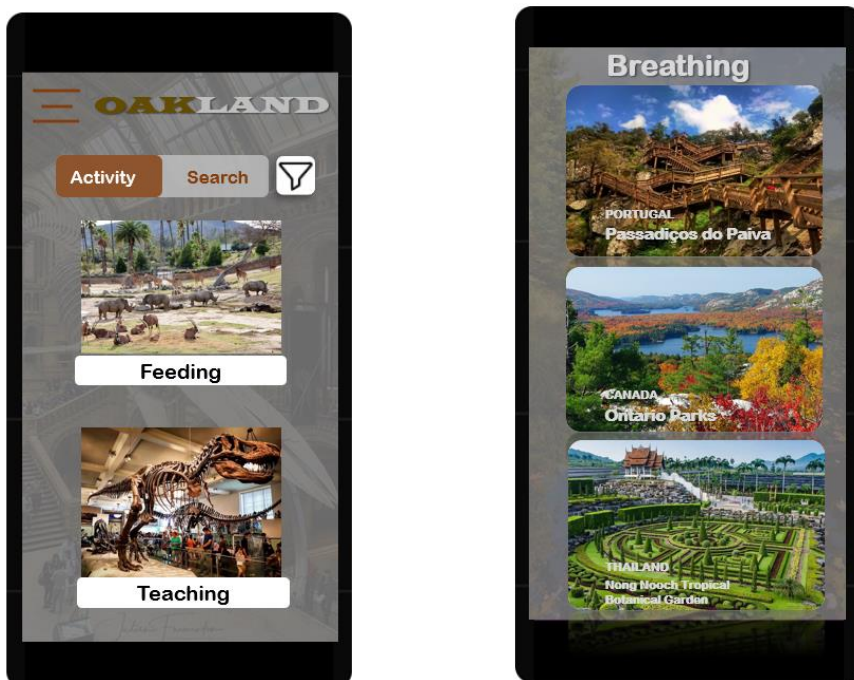


Fig 26 – Preliminary version of the prototype



The final version of the prototype took into account the interviewees feedback, in addition, it aimed to reflect the experience factors identified in the data analysis phase. Based on this, concepts were implemented to make the product tangible in order to promote better experiences for users.

Online educational service solution on Ecotourism Context – OAKLAND SERVICE

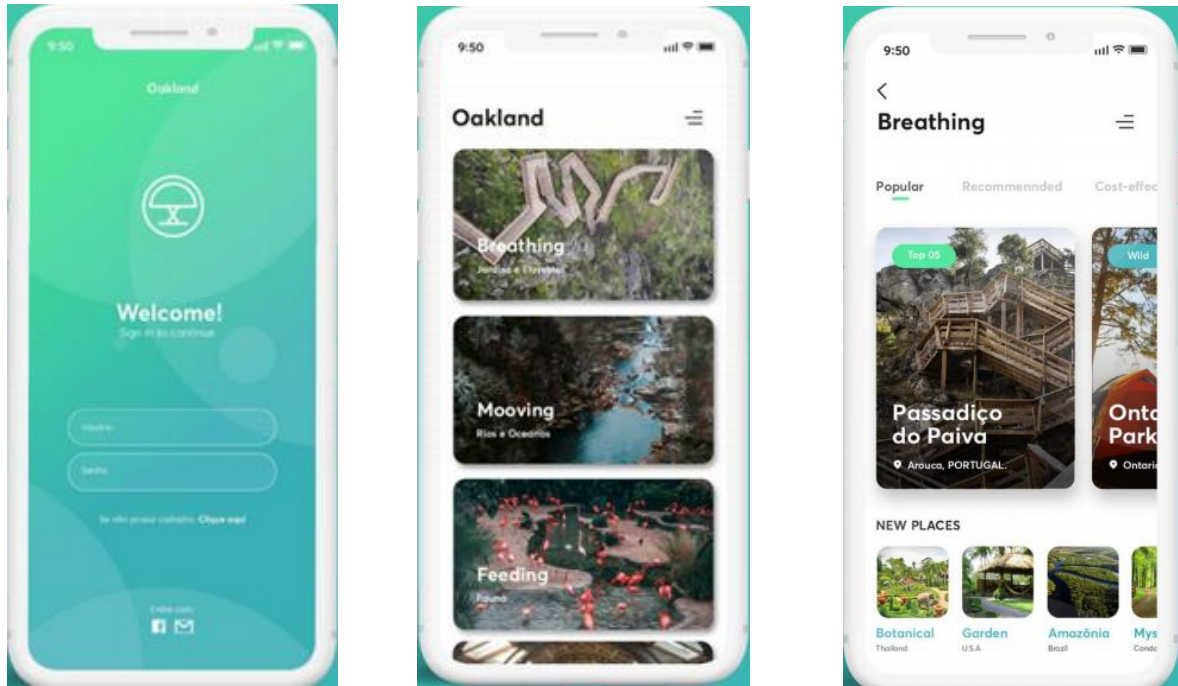
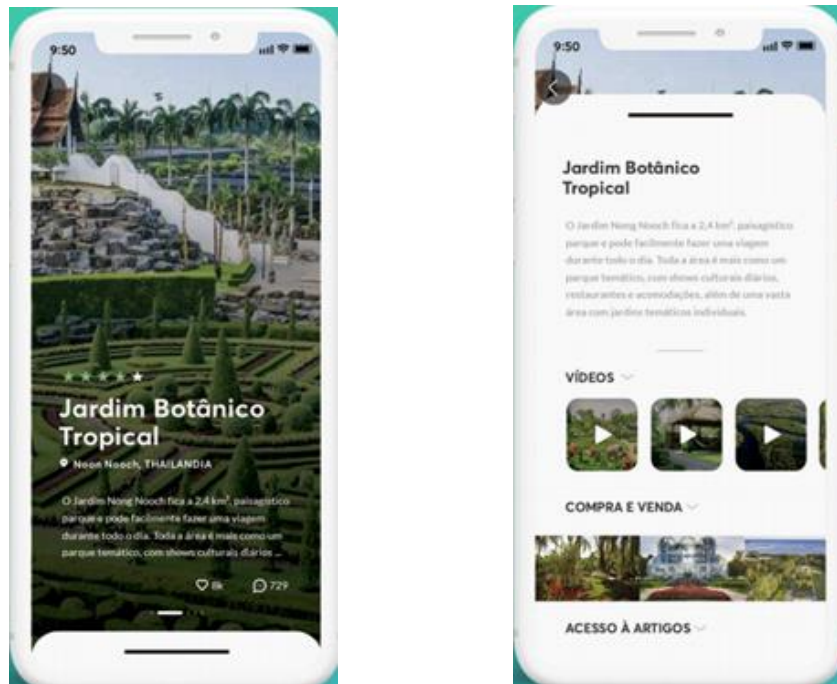


Fig 27 – Final version of the Oakland Prototype



6 DISCUSSION AND CONCLUSIONS

Regardless the service offered, every provider must maintain constant focus to innovation and creativity, adjusting its value proposition to consumers' needs and requirements. When it comes to ecotourism offers online, the biggest challenge is related to the possibility of having an on-site experience in natural environments. On the other hand, a technological solution can allow an ecotourist to live experiences and still promote environmental awareness to different natural places anytime, anywhere.

The mobility restriction, brought a new reality to the world in which activities without physical contact started to be prioritized. This change of paradigm may influence the adhesion of new consumers to online ecotourism content, since many parks, museums, zoos, among others, are still closed or with a restricted number of people allowed per time and urgently demanding for support.

The Oakland service' platform offers online educational content, developed in network and partnership with experts such as research laboratories, natural science museums, zoos, botanical gardens, and nature parks. The main challenge of this project was to make the concept of ecotourism tangible to offer the most real experiences to customers and promote environmental awareness through online educational content. The great legacy of this work is a technology-based solution that offers ecotourism services that disseminate information with high-quality content for environmental awareness, as well as, allows all users to share and increase its data base. Oakland intends to be a big tree with many services' branches, some oriented to academics and researchers, some to curious potential customers and also have specific content designed to younger market segment.

This study contributes with Service Design methodology to a demanding circumstance of touristic field that is under a difficult crisis. Moreover, the best practices analysis permits to consider many technologically feasible ways to *tangibilize* and bring a discovery' factor to each customer journey.

Hence, in order to improve this proposal, it is necessary to conduct further studies researches using for instance gamification in the development of new services aimed at ecotourism, which could attract other customers profile for the market and consequently indorse environmental awareness to more people.

In addition to Covid-19, the world is experiencing other transformations and revolutions that lead us to question everything, even the way museums are prepared ¹⁴- This work contributes to this change - and it is an opportunity because the place of a museum can be the place where it is what we want to show to others and thus reach everyone being inclusive and non-evasive.

¹⁴ <https://www.bbc.com/news/entertainment-arts-53219869>

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APPENDIX A: Interview script with potential customers

1. What is the main motivation to practice Ecotourism / Agrotourism?
2. What is the level of concern with the preservation of the environment? Do you have good preservation practices in your daily life?
3. What is your view on the concept of Ecotourism / Agrotourism?
4. Are Agrotourism / Ecotourism offers evaluated by tourists (before consumption)? Do customers have a critical view of the services offered?
5. Ecotourism / Agrotourism are tourist activities focused on a niche market?
6. Does environmental awareness grow from the moment there is interaction with nature?
7. Can environmental values (in individuals) be used to target potential ecotourists / agrotourists?
8. What are the main positive aspects during an ecotourism / agrotourism experience?
9. In the same context, in what ways could the tourist experience be improved?
10. Do you think it is possible to standardize an ecotourism / agrotourism service to serve all types of audience, without restrictions?

APPENDIX B: Interview script with potential service providers

1. What level of environmental awareness is allowed to communicate on your online media?
2. Is there interaction with the public in offering these services? If so, what is the level of concern of users (in general) with the preservation of the environment?
3. Are the online educational services offered available to all types of public, without restrictions?

APPENDIX C: Virtual Documents analysis

Websites' List				
Nº	Institution	Country	Website	Description
1	Museu do Amanhã	Brazil	https://museudoamanha.org.br/	It's a Science Museum Data about the corona virus is only in Portuguese, not all the people might understand how to create a tour. The museum mainly explore, imagine, and conceive all the possibilities for constructing the future. An experimental museum, where the contents presented
2	BioParque do Rio (Zoo)	Brazil	https://bioparqueorio.com.br/	It's a Zoo . Covid-19 right on the homepage and it declares that several services are suspended.
3	Parque das Aves	Brazil	https://www.parquedasaves.com.br/en/	It's National Park . In Brazil dedicated to birds. It is in English - closed and asking for support for their work that cannot be hyperlinked to chat @ whatsapp
4	Natural History Museum	England	https://www.nhm.ac.uk/	It's a Museum and offers online a Big Virtual Museum : 13 ways to explore from home - the blue whale in the Hintze hall has real noise of people simulating the real museum. It has a lot to explore online
5	Yellowstone National Park	EUA	https://www.nps.gov/yell/index.htm	It's a National Park . It is associated by network and share services with other parks in the country. It has an official advertise to Covid-19, limited services available. It has some articles on several scientific topics.
6	Ontario Parks	Canada	https://www.ontarioparks.com/en	It's a National Park . Articles on several topics available with blog format.
7	Grand Canyon National Park	EUA	https://www.nps.gov/grca/index.htm	It's a National Park . It is associated by network and share services with other parks in the country. It has an official advertise to Covid-19, limited services available. It has some articles on several scientific topics.
8	Palmengarten	Germany	https://www.palmengarten.de/DE/index/index	It's a Botanical Garden . They do not have online educational offers - however they do offer several structured data about some flower species.
9	Pinacoteca de São Paulo	Brazil	https://pinacoteca.org.br/pinacoteca/	It's a Museum of Visual Arts with an emphasis on Brazilian production from the nineteenth century to the present day. It is closed right now due to the Covid-19 but offers several services online. Available on film and video from Pinacoteca's collection - virtual tour #Pinacoteca
10	Metropolitan Museum of art	EUA	https://www.metmuseum.org	It's an Art Museum - it is easy to experience the museum anywhere - when the window unfolds three other options - explore learn and inspire - it goes from 360° experiences - to hundreds of essays and works of art with chronologies, telling the story of art and global culture through the
11	Art Institute of Chicago	EUA	https://www.artic.edu	Videos, Explore thousands of artworks in the museum's wide-ranging collection - They pulled a few different ways to experience the exhibition El Greco: Ambition and Defense online.
12	Museu Nacional de História Natural e da	Portugal	https://museu.nh.gov.pt/pt	The Natural History Museum . The website can be accessed in Portuguese and English. Content as multimedia implemented as part of a reabertura do Museu e Jardins, online.
13	Museu de les Ciències València	Spain	https://www.cic.es/es/museo-de-les-ciencies/museo-de-les-ciencies/des-cubre-el-museo.html	It's a Science Museum with an Oceanarium - It has low prices for "solo tourism" online does not have many to offer beyond buying tickets information about the spaces - the pictures are not very big and exports essential the architecture. It has English, Spanish, Chinese and Vietnamese.
14	Natural History Museum of the University of Pisa	Italy	https://www.museo.unipi.it/en/	Its Natural History Museum out belongs to the University of Pisa - And is one of the most notable museums in the world. Not much content available online, essentially text.
15	CosmoCaixa	Spain	https://cosmo-caixa.es/pt/cosmo-caixa-las-velas	It's a Science Museum - Web content only in Spanish and Catalan. It has a Digital App with 3D pictures and an animated giraffe mall fishes; under this Appra that live like a discovery window and an experiment window - in side the window one can download pdf with tutorials for experiments
16	The National Museum of Nature and Science	Japan	https://www.nhk.go.jp/english/	It's a Science Museum - Web template with difficult access. However it has available online many as a collection database of specimens and materials' includes relevant information for each category of specimens. It has National Museum of Nature and Science.
17	National Science Museum Republic of Korea	South Korea	https://www.scienc.go.kr/en	Short description of contents, the separate on the future of technology is the most complete and interactive one. It is available in English and Korean. No specific information for Covid-19.
18	San Diego Zoo	EUA	https://www.sandiegozoo.org	It's a Zoo . Starts by requesting support on several different amounts. It is an limited experiences. Very nice pictures and short description on each species. They have live cameras that you can see many animals in the zoo.
19	Nong Nooch Tropical Botanical Garden	Thailand	http://www.nongnoochtropicalgarden.com/	It's a big sortful of different tourist services in between a Botanical Garden . It is available in English but the homepage with a device on safety and health is in Thai.
20	Kirstenbosch National Botanical Garden	South Africa	https://www.sanbi.org/gardens/kirstenbosch/	South African National Biodiversity Institute is a Scientific authority - works as influencers and advocacy - by measuring biodiversity value, investing in ecological infrastructure, eco system based on climate change, streamlined environmental decision making, well structured network in the several
21	The Butchart Gardens	Canada	https://www.butchartgardens.com/	Its Botanical Garden in Canada they have them all gardens
22	Kew Gardens	United Kingdom	https://www.kew.org/	Its Botanical Garden in London, it is UNESCO World Heritage site. It starts with advice on limited number of visitors and request for donations. They are a global resource for plant and fungal knowledge, with unparalleled expertise, collections and partnerships, and reinforce the awareness on
23	Brooklyn Botanic Garden	EUA	https://www.bbkg.org/	Its Botanical Garden they have a database that can be accessed online - they have a suggestion of activities you can do with your children at home.
24	Jardim Botânico do Rio de Janeiro	Brazil	http://www.jbrj.gov.br/	Its Botanical Garden - It is an application with virtual (disponível para o sistema Android e iOS gratuito) é uma cartilha virtual em pdf sobre a flora evolutiva. Nos dois serviços consiste em sua totalidade de forma presencial.
25	Na'Aia Kai Botanical Garden	Hawaii	http://naaikai.org/	Its Botanical Garden - It is temporary closed. It is in English. It has gardening how-to advice (some posting and other topics), it has an online bookstore, it has a full window to forms of financial support.
26	Koishikawa Korakuen Gardens	Japan	https://www.gotokyo.org/en/spot/24/index.html	college courses by category, several ways to network according
27	Montreal Botanical Garden	Canada	https://www.mcgill.ca/mcgill-botanic-garden	Its Botanical Garden , interarium and planetarium - Free access for young visitors until the end of August - science at the Jardin botanique - there is a list of scientific publications, there is a window for further reading and a link to experts' blog, there is a discover what you can see each month in a
28	Claude Monet's Gardens	France	http://galerie.org/gardens/monet/english.htm	It's the home village of painter Claude Monet. With special gardens and is closed right now. It has very short information, small pictures.
29	Denver Botanic Gardens	EUA	https://www.denverbotanicgardens.org/	Its Botanical Garden Sales Home for online courses like Explorations in Botanical Illustration They have a big blog with a reopening plan
30	Jardim Botânico de Curitiba	Brazil	https://www.curitiba.pr.gov.br/conteudo/jardim-botanic	Its Botanical Garden - There isn't a proprietary website
31	Jardim Villa d'Este	Italy	http://www.villedeste.it/en/	It's a Garden - Very old website. It is closed at the moment can be accessed in English and Italian. The place is closed at the moment because of COVID-19
32	Royal Botanic Gardens	Australia	https://www.rbg.gov.au/	Botanical Garden Covid information update. They have virtual events, like science seminars, online shop - from Cultivate Exhibition Highlights - with Free Shipping within Australia
33	Chatsworth House	United Kingdom	https://www.chatsworth.org/	It's a Garden - pre-booked visits only - Virtual tour - pdf available Explorers Garden Trail -
34	Desert Botanical Gardens	EUA	https://dbg.org/	Desert Botanical Garden they have available online pdf with activities I linked with Sonoran quarterly publication with scientific goals.
35	Museu de História Natural e da Ciência da Universidade do Porto	Portugal	https://mhnc.up.pt	It's a Natural History Museum - They offer podcasts with educational content focused on culture and the environment. They try to identify the public's perceptions and expectations to develop content that interests them, without escaping the essence of the Museum. Games a boutique and accessibility.
36	EO Wilson Biodiversity Laboratory - Gorongosa	Mozambique	https://eowilsonfoundation.org/eo-wilson-laboratory-gorongosa/	Biodiversity Laboratory they have videos on Vimeo
37	Museu de História Natural do Lubango	Angola	No website	The Global Plants database is a growing collection of nearly three million high-resolution type specimens and related materials from community contributors around the world. The Herbario do Lubango (LUBA) is referred to the https://plants.jhu.edu/en/2019/03/09/museu-de-historia-natural-do-lubango
38	National Geographic	EUA	https://www.nationalgeographic.com	It's a Magazine They have an inspiring webpage only to visit from home with things to explore from home - simple day-to-day plans for your kids. Find a science lesson via - and enjoy them at home.
39	Nature Magazine	United Kingdom	https://www.nature.com	Nature is a weekly International Journal publishing the finest peer-reviewed research in all fields of science and technology on the basis of its originality, importance, interdisciplinary interest, timeliness, accessibility, elegance and surprising conclusions. Nature also provides rapid, authoritative
40	Science Magazine	EUA	https://www.sciencemag.org	It's a Magazine
41	Senckenberg Nature Museum Frankfurt	Germany	https://museumfrankfurt.senckenberg.de/en/	It's a Museum of Biodiversity in Frankfurt Asking for advance booking. The educational programs have public lectures in German that are available in YouTube; they also have projects to develop presentation but very well documented online, they are preparing a newsletter but it is not available yet.
42	Berlin Zoo	Germany	https://www.zooberlin.de/en	It's a Zoo - Your visits to the zoo in the musical times - via admission with online tickets only. They have a link specific for support with several hypotheses for it
43	Robert Koch Institute	Germany	https://www.rki.de/EN	It is the government's central scientific institution in the field of biomedicine
44	Torres del Páine	Chile	https://torresdelpaine.com/en/	It's a National Park - We report the suspension of access to the Torres del Paine National Park for domestic and foreign visitors. This is meant to be a measure to prevent the spread of COVID-19. At the https://www.torresdelpaine.com/en/
45	Lake Nakuru National Park	Kenya	http://www.kws.go.ke/lake-nakuru-national-park	It's a National Park - It has a video and a photo galleries; they have Procurement Reports to download.
46	National Parks in Thailand	Thailand	https://www.thainationalparks.com/	Thailand National parks
47	Jardim Botânico José do Canto	Portugal	https://josedocanto.negocios.it/	Botanical Garden in Azores island, website with small pictures and quotes for visitors in Portuguese
48	Arenal Volcano National Park	Costa Rica	https://www.arenal.net/arenal-volcano-national-park	It's a National Park .
49	Jiuzhai Valley	China	https://en.jiuzhai.com/	It's a Natural Park - with a proper window to download - https://en.jiuzhai.com/https://en.jiuzhai.com/ tourism - It is possible to hike in groups of five people and with a guide. The website can be translated in seven languages built links to different websites, outdoor. Nice pictures. No data on scientific topics of
50	Victoria and Albert Museum	United Kingdom	https://www.vam.ac.uk/	Art Museum , temporarily closed. Available in English. They have some available online content presented like a blog, however they do not have anything prepared specifically for this period.