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Departamento de Comunicação
e Arte

**SYDNEY
DE
ALMEIDA
NETO**

**UX RESEARCH: UMA PROPOSTA BASEADA NO
DESENVOLVIMENTO DO PORTAL DA UA**

**UX RESEARCH: A FLOW PROPOSAL BASED ON
THE UA WEB PORTAL DEVELOPMENT**



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2021

Departamento de Comunicação
e Arte

Dissertação apresentada à Universidade de Aveiro para cumprimento dos requisitos necessários à obtenção do grau de Mestre em Comunicação Multimedia, realizada sob a orientação científica da Professora Doutora Ana Margarida Pisco Almeida, Professora Associada do Departamento de Comunicação e Arte da Universidade de Aveiro, e da Professora Doutora Andreia Pinto de Sousa, Professora Auxiliar Convidada do Departamento de Comunicação e Arte da Universidade de Aveiro.

Dissertation presented to the University of Aveiro as a fulfillment of the necessary requirements to obtainment of the Master's Degree in Multimedia Communication, accomplished under the scientific supervision of Professor Doctor Ana Margarida Pisco Almeida, Associate Professor of the Department of Communication and Art of the University of Aveiro and the supervision of Professor Doctor Andreia Pinto de Sousa, Guest Assistant Professor of the Department of Communication and Art of the University of Aveiro.

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palavras-chave

acessibilidade, usabilidade, experiência do utilizador, co-design interação humano-computador.

resumo

Como um processo inerente à área de Interação Humano-Computador (HCI), a Investigação em Experiência do Utilizador (UX Research) pode ser vista como uma estratégia de apoio ao desenvolvimento de produtos digitais quando princípios de usabilidade e acessibilidade são utilizados para impulsionar a abordagem adoptada. Práticas e estratégias baseadas na coleta de dados relativos à experiência do utilizador podem facilitar a geração de inputs para impulsionar desenvolvimento de produtos digitais bem como suportar a defesa de requisitos. Neste contexto, esta investigação está centrada na observação do processo de UX Research no desenvolvimento do novo portal web da Universidade de Aveiro com o objetivo de compreender como a prática da Investigação em UX pode apoiar a abordagem metodológica utilizada, no que diz respeito ao suporte de requisitos, identificação de tipologias de problemas da interface, e recolha de informação para a melhoria contínua do desenvolvimento do Novo Portal da Universidade de Aveiro (UA). Para este fim, foi utilizada uma Metodologia Mista, Quali-quantitativa fundamentada na estrutura de Grounded Theory, em que parte-se do processo indutivo da observação dos dados, delimitado à observação da nova Área de Notícias do portal web. O tratamento estatístico permitiu saber quais as fontes da UX Research com maior capacidade para levantar dados dos utilizadores finais, qual delas mais dá suporte aos requisitos, ajuda na identificação de tipos de problemas da interface, e apoia o desenvolvimento de soluções de produto. Como consequência do processamento de dados, esta investigação apresenta uma proposta de fluxo de Investigação em UX para apoiar a recolha de dados e motivar os envolvidos no processo para atender as necessidades e interesses dos utilizadores finais.

keywords

accessibility, usability, user experience, ux research, co-design, human-computer interaction.

abstract

As a process inherent to the HCI area, UX Research can be seen as a strategy that supports the development of digital products, namely when usability and accessibility guidelines are used to drive the approach adopted. Practices and strategies based on user experience can facilitate understanding the generation of inputs to drive the digital products development as well as support requirements. In this context, this research is focused on the observation of the UX Research process in the development of the new web portal of the University of Aveiro aiming to investigate how UX Research practice can support the methodological approach used, regarding requirements support, identification of typology interface problems, and collection of information towards the continuous improvement of the development of the University of Aveiro (UA) New Portal. For this purpose, a Mixed Methodology was used based on the Grounded Theory framework, by the inductive process of data observation, delimited to the observation of the new News area of the web portal. Data saturation allowed us to know which UX Research sources had more capacity to raise data from the end-users, support requirements, identify types of interface problems, and supply the development of product solutions. As a consequence of the data processing, this research presents a UXR flow proposal to support data collection and engage stakeholders with the end-user needs and interests.

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List of Acronyms

AAA: Accessibility

ARQINF: Information Architecture

BUG: Bug (computational/system issue)

DGN: Design

HCD: Human-Centered Design

HCI: Human-Computer Interaction

INT: Interaction

OCC: Occurrence

POL: Political

PS1: Adjustment made

PS2: Correction performed

PS3: New feature developed

PSOC: Social Presence

TEC: Technical

UCD: User-Centered Design

UX: User Experience

UXR: User Experience Research

VIS: Visual

Chapter 1 – Introduction

It is publicly acknowledged that we live in a time when the information technology industry is advancing and manifesting new communication paradigms (Jenkins, 2006; Lemos, 2005; Peruzzini, Grandi, & Pellicciari, 2017). As part of this industry, programmers, developers, researchers, designers, and many other creative professionals perform a daily search to design interfaces that are increasingly intuitive, appealing, and enjoyable (Bailey, 1996; Cropley et al., 2011; Hassenzahl, 2016; Nielsen & Levy, 1994; Norman, 2004). The pursuit of the interface lies behind the system operation that needs to be useful, efficient, and effective to meet individuals' needs.

This demand becomes continuous, because just as their interaction patterns change, so do the interfaces. Furthermore, it is necessary to be close to the end-users to follow these dynamics of transformation. Cultural differences, digital literacy, and ethnographic and environmental factors influence the way people interact with the New Information and Communication Technologies. Therefore, the problems of Human-Computer Interaction (HCI) stimulate the development of new research (Hassenzahl, 2016; D. Norman, 2010; Tullis & Albert, 2013).

However, a digital product's interface problems can also be linked to how the organization establishes routines and resources. In this sense, HCI's scientific field has shown the need to develop this work with transdisciplinary teams, in which the areas of the teams cross each other. This synergy is one of the characteristics of the workspaces in an Agile¹ environment. The development iteration cycles take advantage of this transdisciplinarity and the search to meet the end user's needs (McPhee & Zaug, 2000; Hassenzahl, 2016).

Giving voice to the individual and respecting people's uniqueness are premises cultivated since the era of the postmodernity. Furthermore, this practice de User-Centered Design (UCD) was established as an approach to relationships among stakeholders and offers an collaborative environment. Moreover, collecting information about the user and making

¹ It is a project management methodology. The term was popularized in 2001 when software development leaders published the Agile Manifesto. "It declared the following values: people over processes; products that actually work over documenting what that product is supposed to do; collaborating with customers over negotiating with them; and responding to change over following a plan." (MCKenna, D. 2016 p 16)

this user participate in the co-design process is not a simple mission (Farrell, 2017; Gray, 2004; Loranger, 2014). The User Experience Research (UXR) has revealed a series of methodological approaches and tools to facilitate this work. Therefore, the collection of information and development requirements for digital products is a challenge for many organizations and an increasingly valued area.

Within UXR approaches, User Testing methodologies emerge as an umbrella that houses several user research and product evaluation techniques, such as usability tests, accessibility tests, in-depth interviews, guerrilla testing, focus groups, and so many other procedures allow the collection of strategic information (Dam & Teo, 2020; Levy, 2015; Gray, 2004; Hartson & Pyla, 2012; Jeff & Chisnell, 2008; Soegaard & Dam, 2015).

Thus, UXR needs to be systematized so that organizations can involve their different stakeholders in decision-making processes. For this, work in the Agile environment needs to be rigorously defended and respected. Furthermore, this premise can reflect on the team's freedom to listen to users and involve them in product development cycles as a strategy (Levy 2015).

In this scenario, this master's investigation arises in an attempt to observe and reflect on the UXR process's contributions in the development cycle of the new portal of the University of Aveiro (www.ua.pt), in a complex context where the institution is both a client and a source of resources. Thus, this research is framed by the view of one of the actors of this process, as a team member also responsible for evaluating the project's digital products by UA labs.

1.1 Characterization of the research problem

To provide answers to the new needs of the academic community and the public directly or indirectly involved with the institution, the new portal of the University of Aveiro (UA) had its first version launched in May 2019. A complete visual and information architecture transformation was implemented: an interface whose elements inherent to interaction design and information organization had been based on over a decade was stopped. New technologies were necessary to build a new digital presence for the university.

The second phase of the new UA Portal's project had triggered between June 2019 and July 2020 with the new News area's launch, and the organizational websites migration from the old templates to the newest (websites of departments, schools, services, and events, called subwebs). All interaction principles, information architecture, and design systems consolidated in the first stage were replicated in the second stage and improved. Still in this stage of the project, the portal developed and delivered a new back office (content management system) to the academic community (a new editor for content management, pages, and subwebs). That is, the new UA Portal also represents the development of several digital products.

To make all this possible, the development of the new portal was based on updated technologies, using Interfaces to Information Systems (API) and React technology (a Facebook Web application development framework). The project² was able to take advantage of a bus of services from the university's information systems. This integration was fundamental for the portal to access Human Resources, News, Authentication, and other data linked to the institution's services.

As a team member of the New UA Portal Web project, the role of the author of this research consisted of conduct the evaluation processes through User Testing methods, and give continuity of the accessibility assure process, starting by Virgínia Chalegre specialist. All the work had supervision by Professor Doctor Ana Margarida Almeida, associated professor from Art and Communication Department.

This is the team that was involved in the whole project cycle

Institutional coordination:

José Vieira (Rectory)

Cláudio Teixeira (STIC)

Paula Rocha (SCIRP)

² More information about the technological aspects of developing the portal, as well as its structure can be found at: <https://www.ua.pt/pt/compreender-portal>

General coordination:

Carlos Santos (DeCA)

Scrum Master

Rui Pereira (STIC)

Communication team:

Cristina Guimarães - Coordination (SCIRP)

Mariana Pires da Rosa

Design team:

Sofia Almeida - Coordination (SCIRP)

Álvaro Sousa - Phase 1 Consultant (DeCA)

Gonçalo Gomes - Phase 2 Consultant (DeCA)

Inês Margarido

Technology team:

Carlos Santos - Coordination (DeCA)

Miguel Guimarães (STIC)

Filipe Trancho - Liaison with external companies (STIC)

Rui Pereira (STIC)

Bruno Andrade (STIC)

António Santos

Flávio Amaral

Vitor Amaral

Evaluation team:

Ana Margarida Almeida - Coordination (DeCA)

Virgínia Chalegre - Phase 1

Sydney Neto - Phase 2

Infrastructure:

ASIC Team of the STIC

Carlos Costa - Coordination (STIC)

José Ramalho (STIC)

Raimundo Ferreira (STIC)

Internal Collaboration:

Members of the community (User Testing)

Communication Pivots, STIC and SCIRP teams

Planos UA

Recantos da UA

External collaborations:

Mindera

Project Box

1.1.2 The new portal structure

The modular structure (Figure 1) made it possible to arrange the contents oriented to the public's profile and areas of interest according to the services, training offers, and projects of the university. A permanent top menu transversal to all the pages was designed, where the user also had quick access to search, language configuration, and accessibility tools.

The image below exemplifies the modular structure layout.

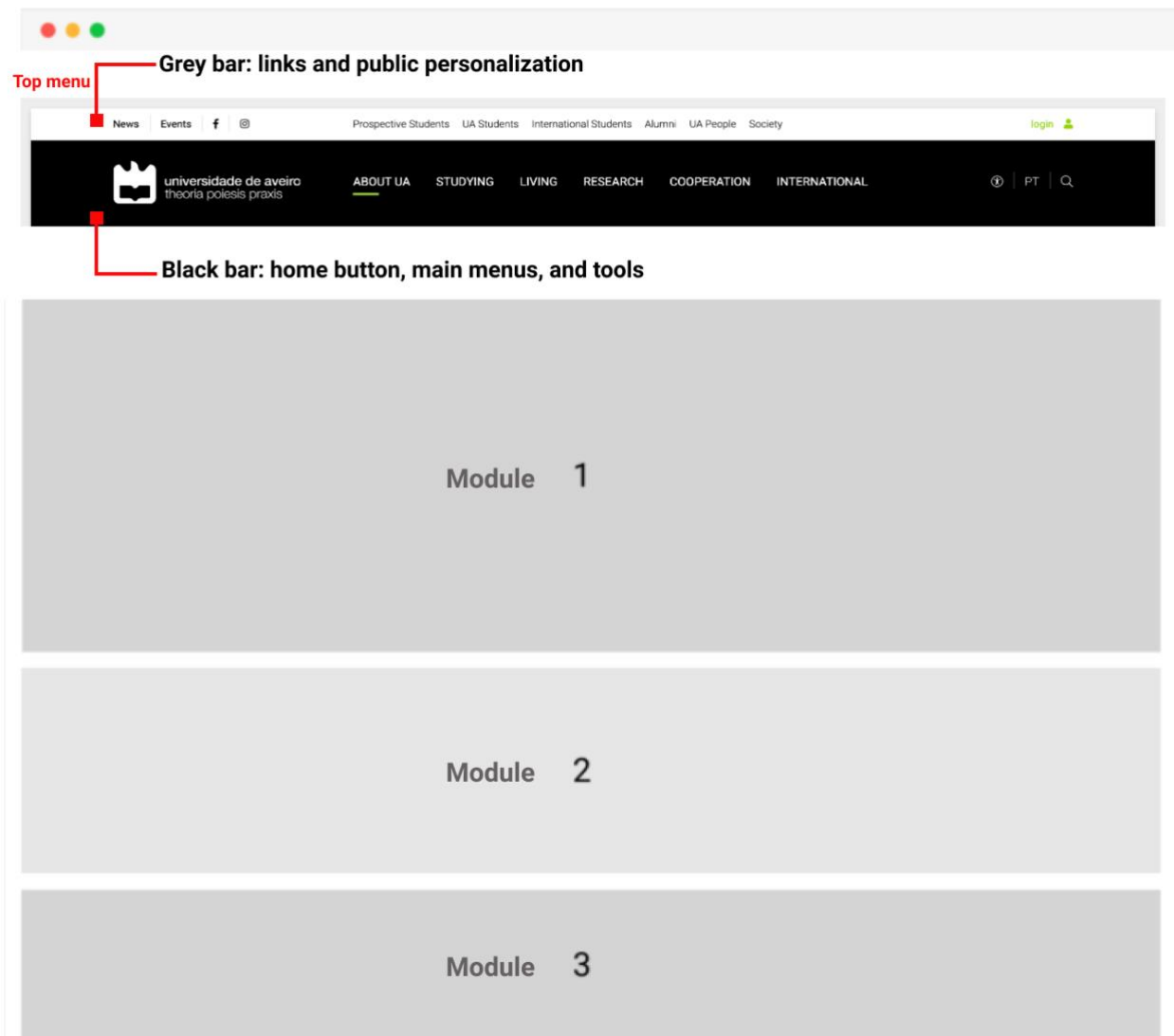


Figure 1: The modular logic allows the information blocks to be reused and edited to fit different pages.

For a better understanding of how the modules behave on the portal, the following example shows the same structure designed for two different purposes (Figure 2). There is a demand for the News area, with: title, photo, previous title, news, highlight, publication

date, share button, and slider. The other module exemplifies how the same component³ can be used for an institutional page, with title, short text, and call to action button.

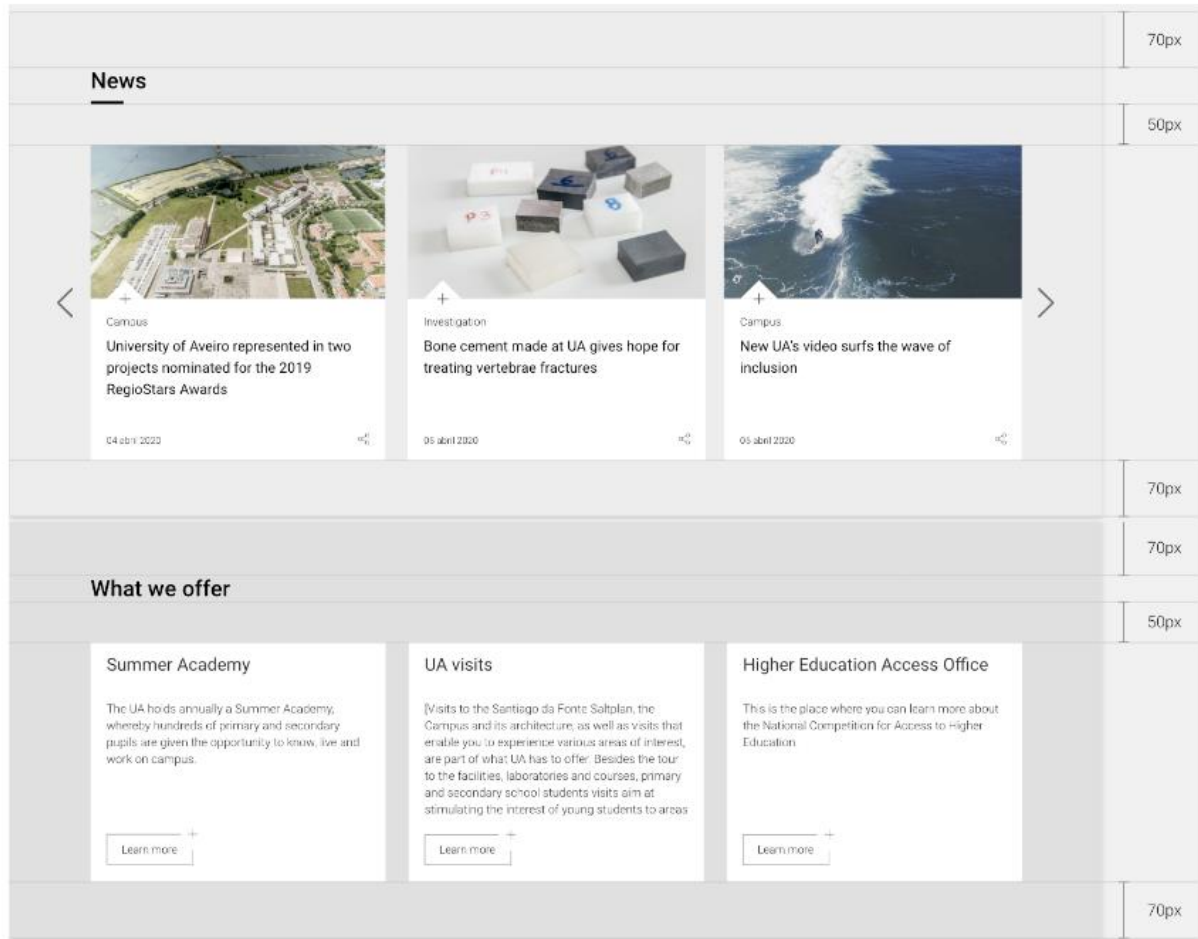


Figure 2: The modules designed for the portal have standardized measurements and dimensions

³ It is a visual representation formed by a set of elements. According to the Interaction Design Foundation, it is like the small pieces of lego that together compose an object (Soegaard & Dam, 2015).

Brad Frost, in Atomic Design Methodology, calls it the organism structure, composed of atoms and molecules as interaction elements (Frost, 2016).

Being synonyms of each other, the various components or organisms compose a template.

This information about the development phases of the new portal, the technologies used, the organization of the modular structure helps to contextualize the scenario in which this research was inserted.

1.1.3 The new UA portal team

The development of the new UA Portal was conducted by people from the institution, whether professors, students, alumni, administrative and management service workers, and partners who somehow had some connection with the university.

The team that worked on this challenge was organized in different areas:

- **Technology:** Providing Web technological solutions in Frontend and Backend areas.
- **Design:** Creating the graphic identity and implementation of the design system for the web pages.
- **Communication:** Working focused on defining institutional content and organizational communication strategy.
- **Evaluation:** Conducting the UXR processes (i.e., Usability and Accessibility Testing, Specialist Review, and Quality & Assurance routine).

All the activities produced by each of these areas were facilitated by a general coordination, responsible for the team's articulation with the stakeholders. Despite the specificity of each area, the transdisciplinarity between them is another characteristic of the project, as the Agile environment.

The tasks were organized in sprints, a period of two or three weeks to do them. There were 33 development sprints in total. In the following illustration (Figure 3) is the roadmap of several stages of development of the portal, emphasizing the period corresponding to the construction of the new News Area the object of delimitation of this study.

General road map of the new UA Portal

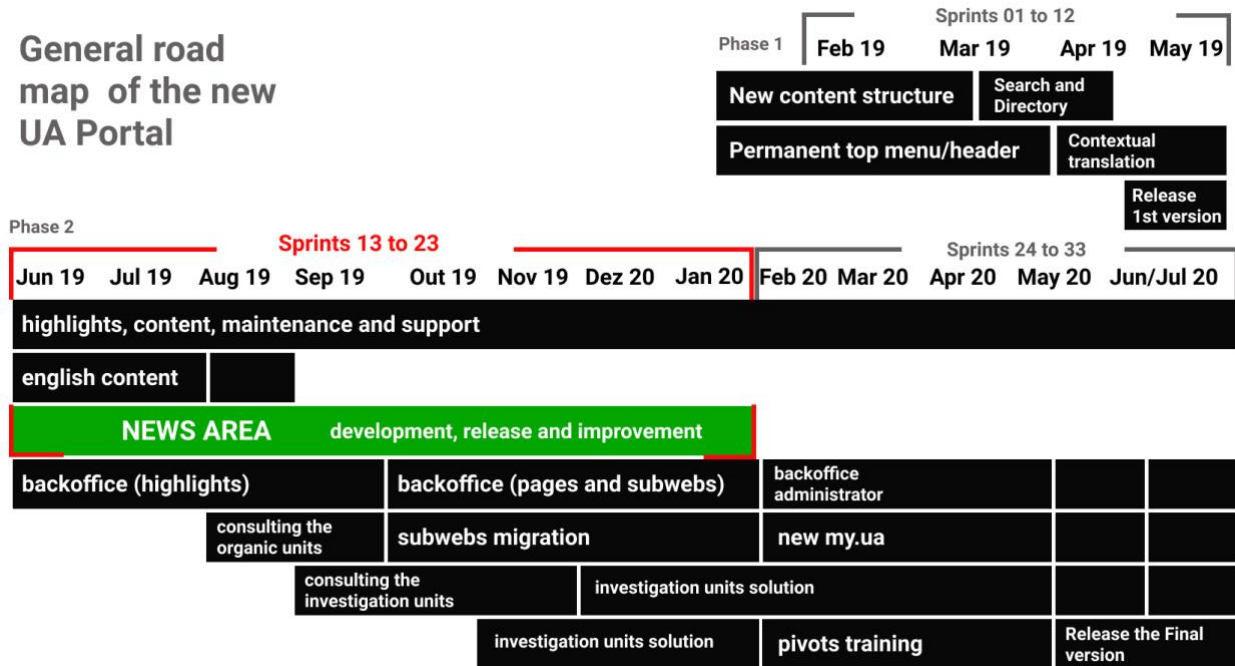


Figure 3 General road map of the info-products linked to the new UA Portal project presented during a stakeholder's meeting in March 2020, highlighting the Sprints 13 to 23 related to the evaluations of the new News area.

As this dissertation is focused on the UXR theme, this study concentrates on work realized by the evaluation team, which was assigned to the role of involving stakeholders and end-users in the most varied UXR approaches, aiming to understand the public's interests and needs, identify problems related to the interface dimensions, and provide the team with relevant information at each stage of the iteration and development cycles. Promoting a culture of defense of users also meant encouraging good usability and accessibility practices throughout the team.

The User Testing sessions, the observation in the real context, and the monitoring of Stakeholders' Meetings (and other UXR approaches) have several advantages over the development cycles of the web portal by the University of Aveiro. One of the benefits is the opportunity to collect data sets of different natures and thus producing new ideas and decisions.

In addition to the low cost and speedy feedback, the UXR enables gathering information on user needs, user experience, usability, and accessibility. As a reflection, this practice is essential in development environments composed of multidisciplinary teams and in a complex organizational context, where political and institutional decisions play a role in the result of the digital product delivered to the public. In the case of the University of Aveiro, the public also presents complexity, sometimes due to its multiple nature, sometimes due to different needs around the same digital product, the new UA Portal.

Another tricky factor is that besides its responsibilities as a developer of the new portal, the University of Aveiro is simultaneously client and regulator of the fulfillment of quality and accessibility requirements inherent to the digital product.

With regards to the UX Research practice in the context of HCI and view of the above, this research aims to answer the question:

How can the UX Research support both the gathering of requirements and the collection of users' information towards the continuous improvement of the UA Portal development?

The more than 3 million annual accesses, 18 thousand pages, and 178 sites (subwebs) make the UA Portal a large product. In order to make this research possible, we delimited the research boundary to one of the portal's digital products: the new News area.

The differences between the layout of the new and the old news area (Figure 4) are remarkable in terms of the visual aspect and organization of the information.

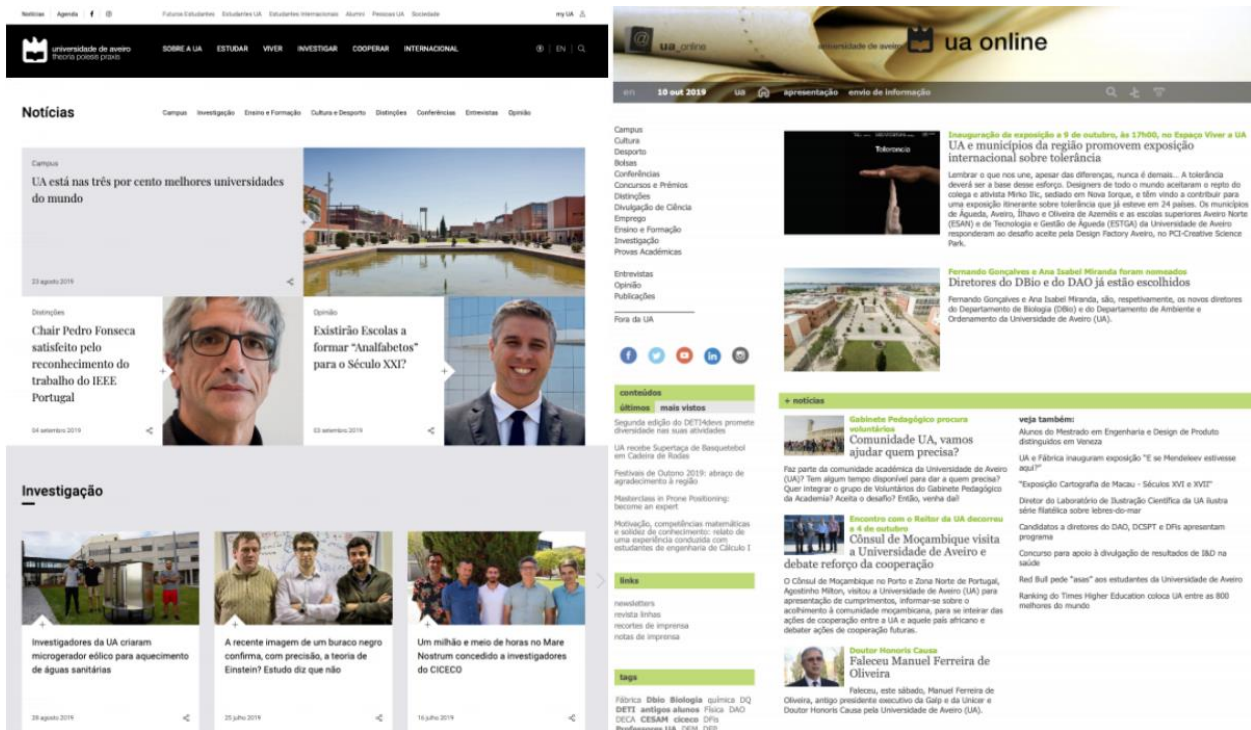


Figure 4 On the left, the new News Area. On the right, the old layout called UAOnline journal.

However, it is important to reiterate that this study did not take into consideration any comparative analysis between the two sites since the starting question directs the investigation to the UXR process adopted during the new portal development.

1.2 Investigation purposes and objectives

Facing the complexity involved in the development context, where the university is at the same time a demander of the product, resource source, and client, it becomes paramount to understand how UXR can be significant as a strategy for product evaluation and stakeholder involvement. Thus, this study aims to observe how UXR can support both: the collection of data from users and the collection of requirements. To achieve these purposes, we outlined the following objectives:

- Identify the UXR approaches implemented during the development sprints of the new News area;

- Gather and organize, in an analysis grid, the data from the UXR approaches used in the evaluation of the new News area;
- Define and categorize the types of problems found and solutions delivered;
- Understanding how each source of information input contributed to support the requirements, identifying problem typology in the product interface, and delivering solutions;
- Observe the iteration cycle between inputs and outputs and propose a flow model of UXR processes.

1.3 Analysis model

The analysis model (Table 1) was designed for two purposes. The first is to explain the dimensions of the concepts addressed in this research and clarify the indicators that made it possible to instrumentalize the data collection. The second purpose is to help perceive the UXR 's data flow from input until it reaches the stage of development outputs.

Table 1 Analysis Model

CONCEPT	DIMENSION	INDICATOR
UX Research (Input of information)	User testing (Gathering information only during testing sessions with recruited users)	- Tasks accomplished (Existence, number or nature)
		- Tasks not performed (Existence, number or nature)
		Interruptions during the test (Existence, number or nature)
		Praise (Existence of verbal and nonverbal expression; Content analysis)
		- Complaint (Existence of verbal and nonverbal expression; Content analysis)
		- Suggestion (Existence of verbal and nonverbal expression; Content analysis)
		Doubt (Existence of verbal and nonverbal expression; Content analysis)
		- Score (SUS, SEQ)
		- Time spent on task (minute)
		- Number of clicks on task
		- Clicked zone on task
		- Time of navigation using 'Tab' on task
	- Sequence of navigation 'Tab' on task	
	Automatic Analysis Tools (Hotjar)	Heat maps recorded in Hotjar (Level of heat or cold, click zone, move zone)
		Complaint received by Hotjar (Existence; Content analysis)
		Praise received by Hotjar (Existence; Content analysis)
		Suggestions received by Hotjar (Existence; Content analysis)
	Input during stakeholders meetings	- Doubt received by Hotjar (Existence; Content analysis)
		Praise (Existence of verbal and nonverbal expression; Content analysis)
		- Complaint (Existence of verbal and nonverbal expression; Content analysis)
- Suggestion (Existence of verbal and nonverbal expression; Content analysis)		
Extra Input Sources (Unplanned or last-minute data collection approaches.)	Need (Existence of verbal and nonverbal expression; Content analysis)	
	- Team member comments (Existence; Content analysis)	
	- Social Network posts (Facebook) (Existence; Content analysis)	
	- Email Messages (Existence; Content analysis)	
	- Comments on the Teams App (Existence; Content analysis)	
	- Comments received in person in an informal approach (Existence; Content analysis)	
Requirements	- Expert review	
	Political	- Institutional Agent Decision (Existence yes/no)
	Technical	- Functional scope (compliance yes/no)
		- Development feasibility (compliance yes/no)
	Design	- Principles of design (compliance yes/no)
	Accessibility Regulatory Conformance level indicator (A / AA / AAA) from W3C standards	- Perceivable information and user interface (compliance yes/no)
		- Operable user interface and navigation (compliance yes/no)
		- Understandable information and user interface (compliance yes/no)
- Robust content and reliable interpretation (compliance yes/no)		
Product	Solution (Output)	- Adjustments made (Existence yes/no)
		- Corrections performed (Existence yes/no)
		- New features developed (Existence yes/no)

1.3.1 Explaining the concepts of Analysis Model

The analysis model was divided into three concepts: UX Research, Requirements, and Product. Each one is equivalent to a milestone of the UA Portal evaluation iterations regarding the News area.

UX Research

UX Research represents the data inputs from the main UX research approaches performed during digital product evaluations. We look at this concept in four dimensions.

The first is the User Testing dimension, which consists of all the processes when the evaluation team needed to approach the end-users to collect information about itself or the product being evaluated. Usability and Accessibility tests fit into this dimension.

The second dimension, Automatic Analysis Tools, refers to the collection of information from Hotjar software⁴. The portal team used this software to analyze interactions in heat map format, record navigation, and receive feedback from users through emojis (on a Likert scale) and text comments.

The third dimension of the UX Research concept is Stakeholders Meetings. These meetings were held with institutional decision-makers and other stakeholders with some link to the university.

Finally, "Extra Input Sources" is the fourth dimension that configures the UX Research concept. It is all the data obtained in an eventual way by unexpected means or unplanned moments, but that helped in the collection of input.

Requirements

This concept relates to the set of standards and rules adopted by the portal team to ensure the product's quality before the team decides to move forward in some step of

⁴ Hotjar (www.hotjar.com) is an analysis software that provides automatic feedback on a user's behavior in an interface, either through heat maps, navigation recordings, incoming messages and access data.

development. Requirements are perceived when some constraints were identified in four dimensions.

The first is the Political dimension, which ensures institutional decisions regarding product specifications.

The second dimension is the Technical. It represents the conditions and technological resources compatible with portal development and operation.

Design is the dimension related the portal's visual identity and design system.

Finally, Accessibility defines the dimension of Requirements from the perspective of defending the Web Content Accessibility Guidelines (WCAG 2.1), defined by the World Wide Web Consortium (W3C,2019).

Product

The Solution dimension defines the Product concept. It represents the outputs developed by the portal team and deliveries in response to the collected inputs. Before a solution is delivered, it needs to be approved by the previous step (requirements).

From the analysis model (Table 1), the flow of the evaluation steps of the digital product was previously noticeable (Figure 5). This form of observation allowed not only to collect the data and understand the iteration of the UXR processes in the development cycle.

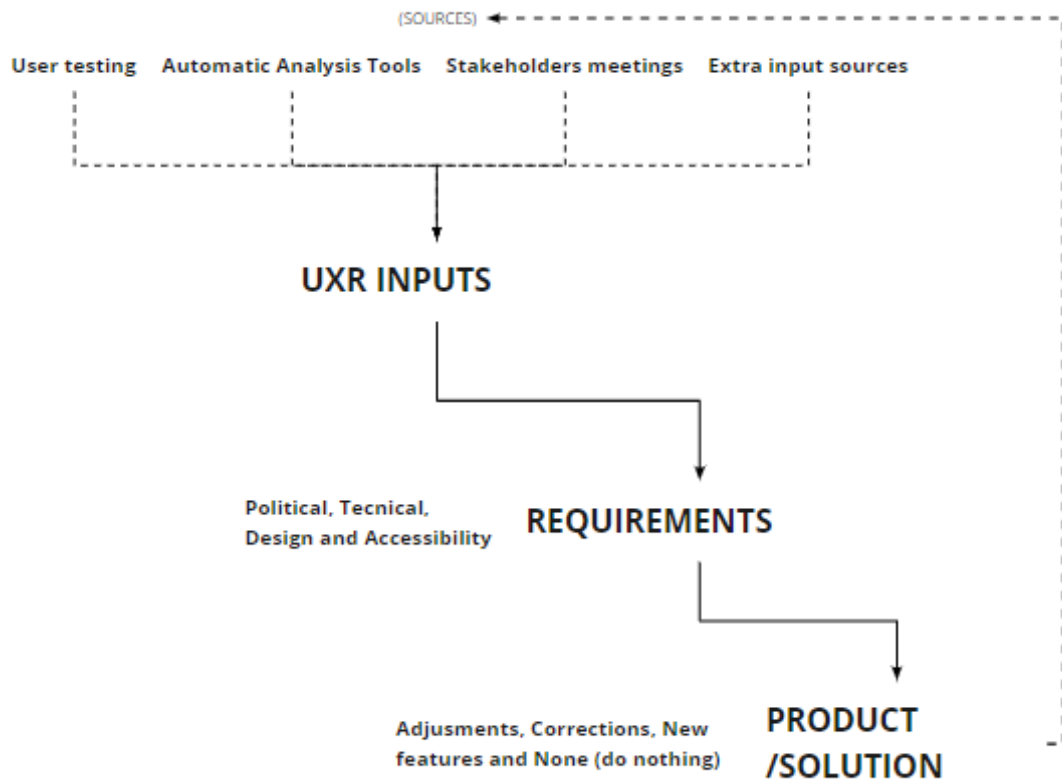


Figure 5 Observation flow used in the study framed by the analysis model.

However, just as important as collecting the inputs and seeing how they can be handy for user-need collection and requirements support, it is paramount to identify the kind of problem this input can represent. Therefore, we referred to Sousa's (2017) scientific contributions. In a Ph.D. thesis on interface assessment in the context of e-Health, Sousa (2017) proposed a model (Figure 6) that allows assessing five dimensions of the interface.

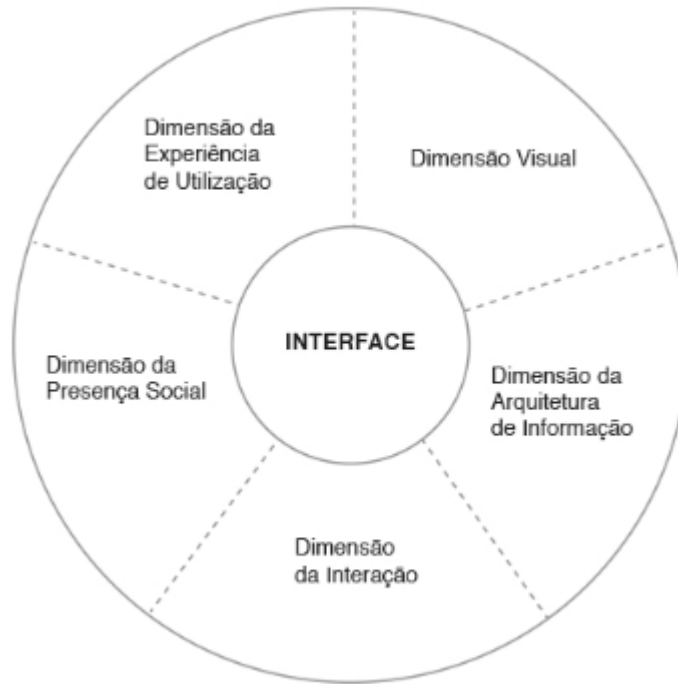


Figure 6 Interface dimensions, by Sousa (2017)

Thus, to classify the nature of the UXR sources' problem, we use the Interface Dimensions, adding the Bugs as a sixth type of problem. Therefore, when we collect the input and observe its flow throughout the analysis model (Figure 7), we try to identify which type of problem relative to the interface dimension this input represents: Visual, Information Architecture, Interaction, Social Presence, User Experience, or Bug.

In our evaluation, the visual dimension was linked to all aspects related to the physical characteristics of an interface element, such as color, contrast, size, texture, and other shape characteristics.

Information Architecture concerns to the organization of information and interface elements, ease, or difficulty navigating or finding some information or understanding some content.

Interaction is considered as the whole process in which the user makes some activities to interact with the interface and expects to get some confirmation feedback, such as clicks, scrolling, slider, swipe, and text selection.

Social Presence had worked under the social or institutional representation of the digital product to the user. When the client relates to the “brand” that the product represents as if it were something with personality.

The Experience of Use is the dimension that represents the user’s emotional manifestations concerning the evaluated product.

Furthermore, finally, the “Bug” dimension, added by us, indicates the existence of some software interruption or anomaly that compromises the disposition and functioning of the elements of an interface.

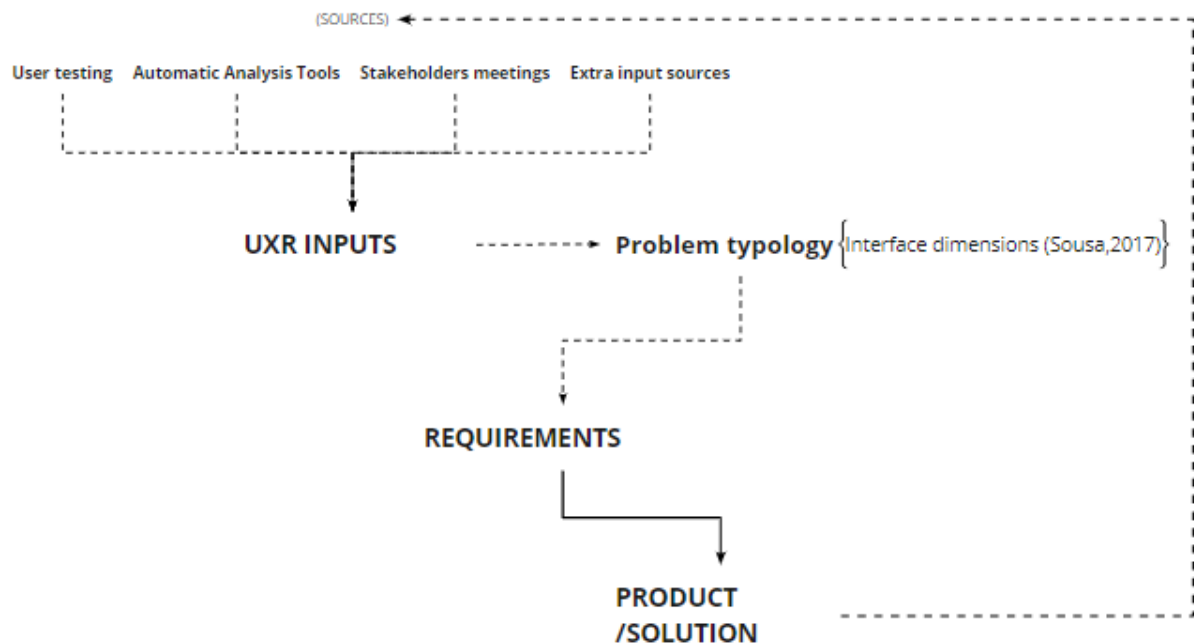


Figure 7 Representation of the data analysis flow uniting the Analysis Model and the classification of the input typology according to the Interface Dimensions.

Therefore, this flow presented replicates the way of reading the analysis model. It also facilitates the understanding of the sequence of steps inherent to the URX process. First, the four sources of data collection in UXR generate inputs. Next, the inputs have the problem typology identified. In a third step, the contribution of each input is analyzed according to development requirements. And finally, once validated in the previous step, the inputs feed into the production of solutions. If retesting with users, such solutions can generate new inputs, which will follow the same flow again.

1.4 Methodological considerations

The research methods used were grounded in the empirical field, based on observations of the real context and of the analysis of existing information and documents. A Mixed Methods Approach was used.

This approach, within the perspective of the "interpretivist research paradigm " (Villiers, 2005), was explored in two frames. The first is Development Research, as it emphasizes the evaluation of processes and work methodology related to HCI. Seels (as cited in Richey & Klein, 2005) "this is often the case with such research, especially if the problem focuses on emerging technologies" (Richey & Klein, 2005 p 27).

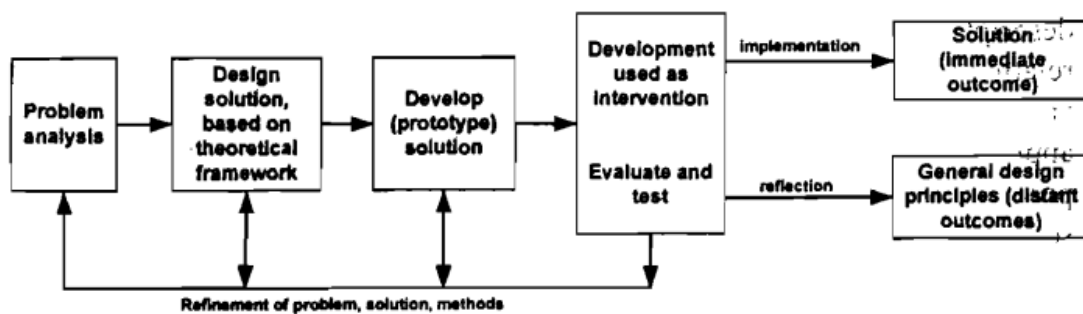


Figure 8 Development Research framework - Villiers (2005)

The second, as the research was also guided from the observation of data (hypothetical-inductive), is inspired in some nuances of the Grounded Theory (Villiers, 2005).

Proper social science research needs to have defined what, who and how will be observed (Quivy & Campenhout, 2005). Thus, one of the major challenges is the correct and reliable choice of data and information sources (Figure 9). In the case of this investigation, the analysis was conducted from data collected in usability tests (and other procedures) performed.

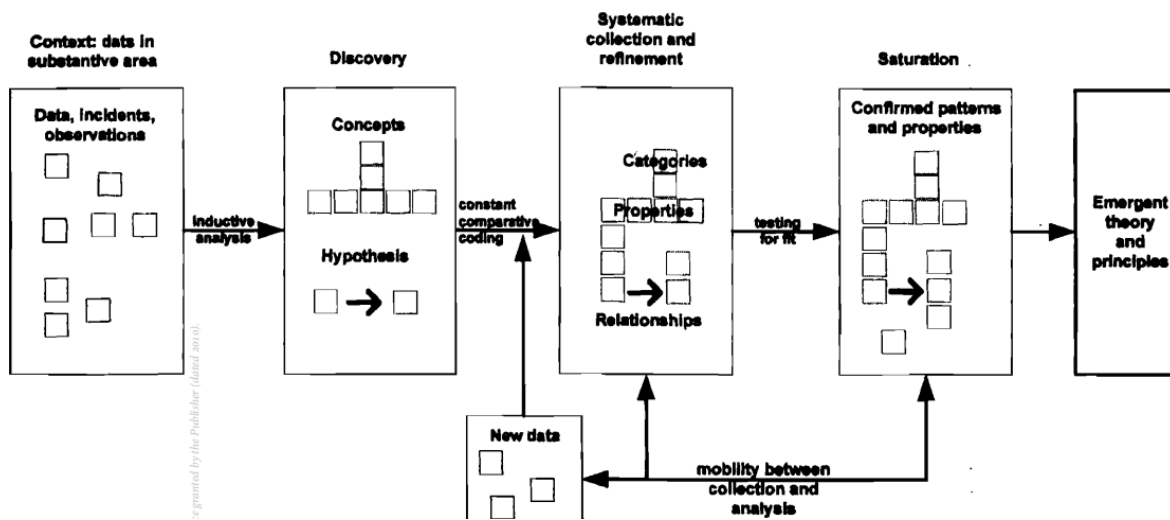


Figure 9 Grounded Theory framework - Villiers (2005)

The quali-quantitative (Figure 10) nature of the study makes the core of this research oscillate between procedures linked to the positivist and interpretivist scholastic (Villiers, 2005).

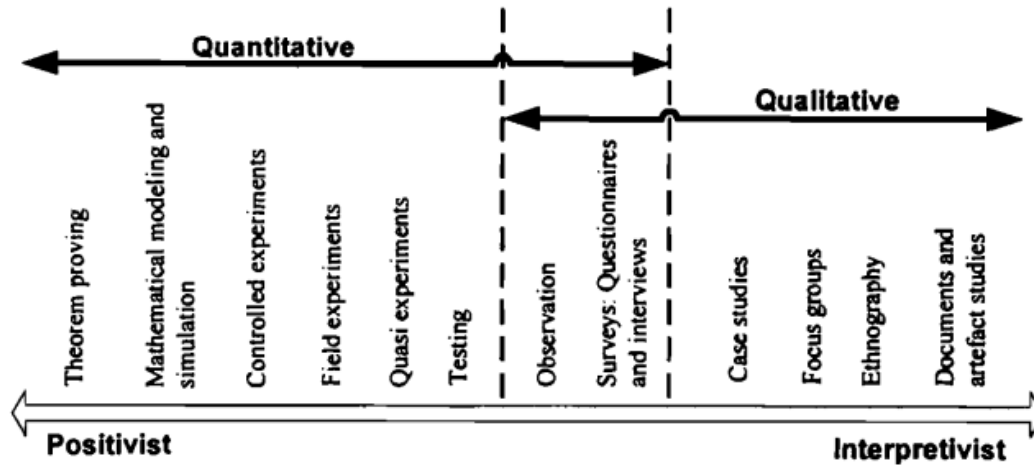


Figure 10 Research methods/strategies - Villiers (2005)

Documents such as usability test reports, accessibility, analysis grids, expert reports, and observation diary notes from stakeholder meetings are available in the Appendix section and will be indicated throughout this dissertation.

1.5 Object delimitation

As we have already mentioned, the vast dimension of the development of the new UA Portal required us to delimit the research focus. The News area was the chosen for such purpose. The reason is that as part of a set of digital products of the new UA Portal project, the News area was the first subweb to be released after the leading portal, in which the same design system and the same modular structure were used (Figure 11).

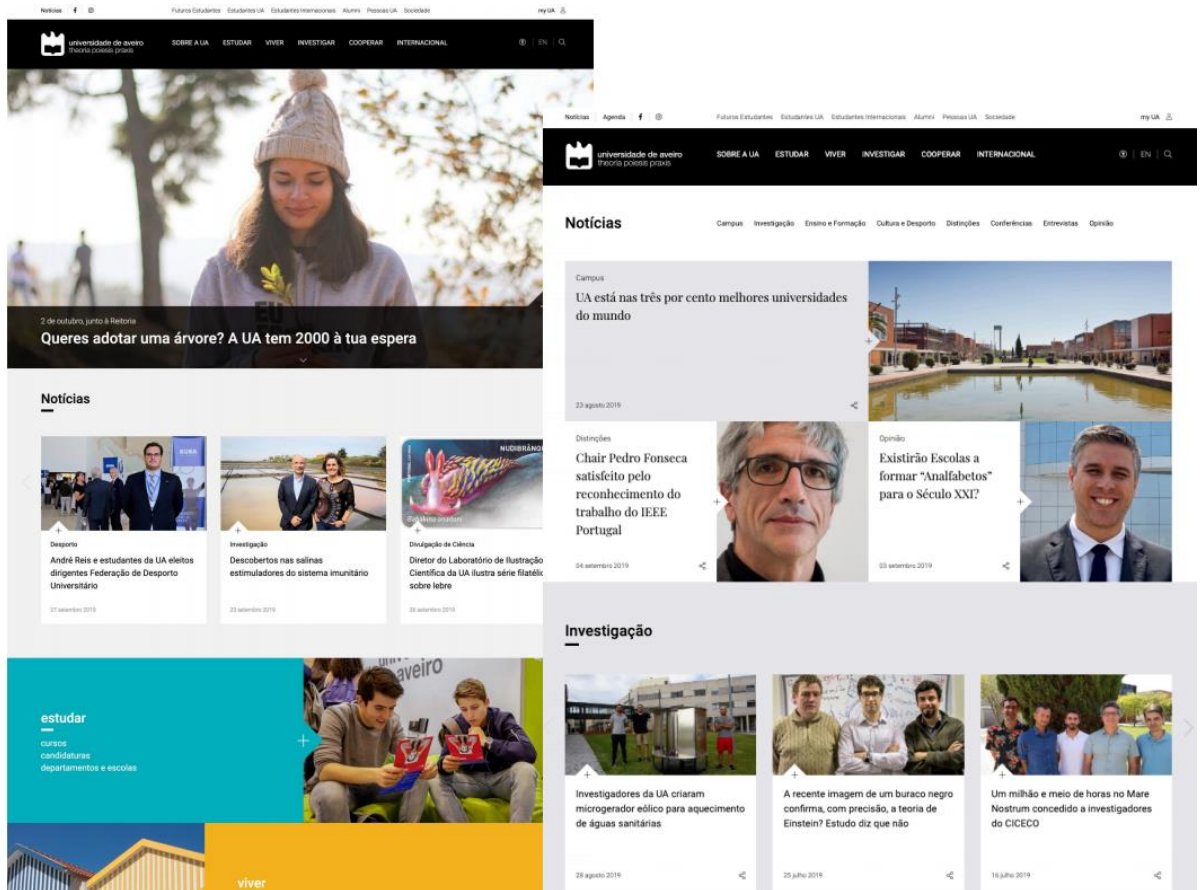


Figure 11 On the left, the new UA portal released in March 2019. On the right, the new News Area launched in October 2019. The leading portal's top navigation bars (gray and black) remained present in the News area (and other subwebs).

Besides accessing the news through the URL <https://www.ua.pt/en/noticias> (<https://www.ua.pt/en/news>), the user can find these contents through the highlight's module of the main page (Figure 11) or using the Agenda (<https://www.ua.pt/pt/agenda>). These entry paths to the news area had also been considered in our analysis. As shown in Figure 12, the news is organized as bellow described.:

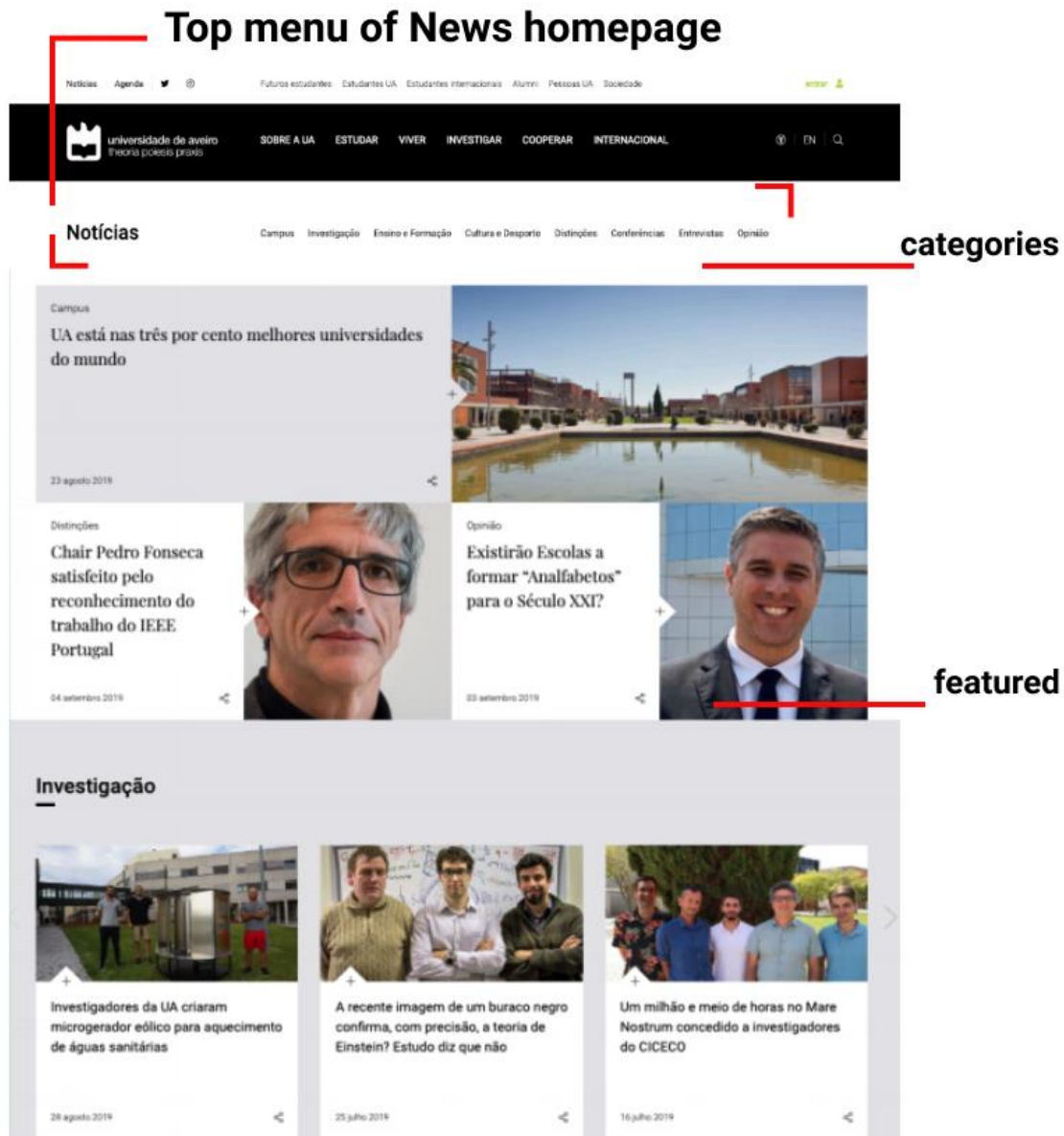


Figure 12 Details of both transversal top bars and modules

- Grey bar: Public personalization bar with areas of interest by user profile, quick links to the news area, agenda, social networks, and authentication.

- Black bar: Home button, main menus, accessibility tools, language and search.
- Modules: Three featured news in the main area and modules separated by news categories (Campus, Research, Education and Training, Culture and Sports, Awards, Conferences, Interviews, and Opinion).

As we explained in section [1.1.2](#) The new portal structure, the News area was built replicating the same general portal structure.

1.6 Data collecting

To collect the data, we start by observing documents and evaluation deliveries between sprint 13 and 23 (July 2019 to January 2020), namely the ones presented in the Analysis Model.

- User Testing: usability and accessibility test reports;
- Automatic Analysis Tools: a collection of incomings received via Hotjar where the URL of the news area was the object reported by users;
- Stakeholders Meetings: observation notes of meetings (field diary);
- Extra Inputs Sources: a collection of comments on social networks in a specific post of the day of the launch of the new News Area; expert review report-

An analysis grid (Table 1) was filled in, with data on the inputs allowing the identification of: the requirements input generated particular problems; the typology of each problem, and what type of solution was delivered. A visual representation (Figure 13) exemplifies the arrangement of the data in the analysis grid.








						
SPRINT	OCCURENCY	INPUT	TPOLOGY	UXR SOURCE	REQUIREMENT	PRODUCT SOLUTION
13	1	"It is necessary Highlight the H2 title News"	Visual	Stakeholders meetings	Design	Adjustment

Figure 13 An example of how the data collected was being organized in the grid analysis

Therefore, it was possible to classify the identification of the sprint as correlated to the collected data, the occurrence, the typology of the problem, the source from which the input was collected, the requirement demanded, and the type of solution that the input helped to feed.

1.7 Data processing

Considering that the data collected was predominantly qualitative, it was statistically treated using a Non-parametric Hypothesis Test, via Descriptive Statistics (Laureano, 2013).

- Dependent variables
 - UXR Sources:
 - User Testing
 - Automatic Analysis Tools
 - Stakeholders Meetings Inputs
 - Extra Inputs
- Independent variables
 - Typology of problem:
 - Visual (Vis)

- Information Architecture (ARQINF)
- Interaction (INT)
- Social Presence (PSOC)
- Use Experience (UX)
- Bug (BUG)
- Requirements:
 - Political (POL)
 - Technical (TEC)
 - Design (DGN)
 - Accessibility (AAA)
- Product Solution
 - Adjustment made (PS1)
 - Correction performed (PS2)
 - New feature developed (PS3)
- Sprint
 - Time between June/2019 to July/2020, splitted in 11 Sprints (period of two or three weeks), namely Sprint 13 to Sprint 23
- Occurrence
 - Number of time that the fact was detected

The univariate descriptive analysis techniques were processed using SPSS⁵ data analysis and statistics software. Moreover, a Chi-square adjustment test was applied to validate the four suggested hypotheses.

⁵ <https://www.ibm.com/analytics/spss-statistics-software>

1.8 Hypotheses

The path to achieving these research purposes also involves some hypothesis testing. The main one is anchored on the view that *each UXR source has a different capability for gathering data about the user needs.*

Nevertheless, the analysis model structure also allows the observation of the development flow in its entirety, from the moment the input reaches the development cycle, passing through the effects that it can provoke until being answered by a solution. Consequently, three sub hypotheses were created.

The first is that the UXR sources have different capabilities to meet the requirements.

The second is that UXR sources have different capabilities for identifying problem typologies.

The third sub hypothesis is that each UXR source contributes differently to generating outputs (or product solutions).

It is expected that with these answers, one can perceive the potential of each UXR source for the generation of development solutions, support requirements, or measurement of problem typologies related to the evaluated interface.

It is also intended that the observation of the correlation between the analysis model variables can contribute to a UXR flow model's suggestion in a context similar to what had been observed in the news area of the new UA portal.

Chapter 2 – Theoretical context

In this chapter we will explain the explored theoretical concepts that underpin this research. The bibliographic research sought to understand what the scientific literature says from the consolidated studies to the most recent on the paradigms of communication mediated by digital technologies.

In the context of the known postmodern society, the literature review also aimed to seek the contributions of studies linked to HCI principles and scientific studies that guide the main UXR practices, linked to the development of digital interfaces and the way humans interact in these environments.

2.1 The UX perspective on the institutional agenda of the new UA portal development

Technological innovation has transformed the way people, institutions and organizations relate to each other. Information and interactions flow in convergent, digital and virtual media through ubiquitous technologies (Dix, 2004). In this networked approach, society has come to be mediated and has acquired the awareness of a new concept of space (McLuhan, 1964; Castells, 1999). In this context, the post-modernist movement emerges and addresses the uniqueness, need and freedom of each individual (Gray, 2004). It is precisely from the post-modernist philosophical perspective that this master's thesis looks at the reality to be understood and the phenomena to be analyzed. In social sciences, this frankness is necessary to make clear to the reader how the gaze and the approach will focus on the facts (Gray, 2004; Quivy & Campenhoudt, 1998).

Many of humanity's habits, from access to information, learning tools, leisure activities, health and well-being devices, relationship applications and countless other needs and forms of interaction, are found today in an environment mediated by digital devices connected to the Internet (Dix, 2004). In the form of data, these interactions are not only mediated but are also produced, stored and distributed in a place where Lévy (1999) defined cyberspace. In other words, cyberspace is both a convergent communication infrastructure and a place where new communication practices are mediated and developed. Years later, as the author of the Theory of Cyberculture,

Pierre Lévy (2007) led the scientific community of media studies to understand mimetism in the process of human-computer interaction, to the point where even the sense of community, of belonging and of sharing (in symbiosis) integrate the construction of a new collective intelligence (Lévy, 2007) whose sharing of knowledge is one of the main characteristics.

By studying the French philosopher Pierre Lévy, the American scientist Jenkins (2008) came to consider that cyberspace also brought changes in the way people interact. At the same time that they are consumers, they are also producers and propagators of content, creating a more participatory culture in which on and off-line communication practices come together.

Discussing these concepts, that were in the basis of the initial approach of the theoretical placement, helps to understand how the nuances of postmodernism (Gray, 2004) can be identified in the way that the University of Aveiro decided to develop the new portal of the institution. It is valid to consider that, in all of them, either in the creation of the new top-level domain, content and tools modules, news area, subwebs and back office, different actors were involved in the construction and development process, such as teachers, students, non-teaching staff, specialists and other agents.

This decision to involve the academic community in each of these stages shows that, despite the level of hierarchy present in its organizational structure, the University of Aveiro has demonstrated that it adheres to the participatory culture, in which one of the priorities is to look at the individual, understand him and meet his needs (Lipovetsky 2004). Instead of outsourcing to develop the portal, the university sought in its structure the necessary resources for the creation and development of the new portal. For McPhee and Zaug (2000), this type of institutional positioning is complex, but contributes to a greater fluidity of organizational communication.

One of the characteristics that define a post-modern institution is the composition of the flow of the Framework (McPhee and Zaug, 2000): Selfstructuring, Membership Negotiation, Activity Coordination and Institutional Positioning. Although the organizational structure of the University of Aveiro is not the focus of this study, it is feasible to identify the nuances of the Framework of McPhee and Zaug (2000) in the executability of the project of the new UA portal. The first, Selfstructuring shows the

capacity of the institution to reinvent itself by promoting a self-structuring. The second, Membership Negotiation aims at negotiating membership, recruiting the university's human resources (students, staff and professors), getting closer to the community, familiarizing and involving people in the portal's evaluation processes. The third, defined as Activity Coordination, can be seen in the objectives to be achieved by the team responsible for development, with routine and result oriented tasks. And finally, the fourth part of the Constitutive Communication Model is the Institutional Positioning in which it is evident the value of stakeholder involvement in decision-making processes.

This model, in addition to reporting on the participatory culture and the valorization of the individual, also evidences the process of self-management, transdisciplinary and participation characteristic of postmodern society (McPhee and Zaugg, 2000).

This quest of the Information Technology industry to practice working methodologies that result in the design of digital interfaces that meet the complexity of different contexts of people is a phenomenon called the Third Paradigm of HCI: "The third paradigm contains a variety of perspectives and approaches whose central metaphor is interaction as phenomenologically situated. The goal for interaction is to support situated action and meaning-making in specific contexts, and the questions that arise revolve around how to complement formalized, computational representations and actions with the rich, complex, and messy situations at hand around them (Harrison, S., Tadar, D., & Sengers, P., 2007, p 6).

According to Harrison, Tadar & Sengers (2007) the First Paradigm can be understood as the period when the human-machine relationship was more engineering oriented, with language and interface difficult to interpret and computers seemed distant from daily reality.

The Second Paradigm represents the emphasis on cognitive aspects in search of understanding the human mind, a phase where it was necessary to create metaphors, such as icons that make the recognition of buttons and their functionality familiar so that man can operate the computer.

And finally, The Third Paradigm clearly shows a phenomenon of the characteristic of postmodern society, characterized by the participation of the human in the design process and also the way that computer-mediated technology began to be incorporated into the routine, mediating relationships and being progressively inserted into the way the person interacts with the world.

2.2 UX Research as an exercise in engagement and participation

Understanding how the new portal was designed required from this research greater care in understanding the approaches to reach users in real contexts. The UCD and UXR are among those approaches that seek a closer approach to users to understand their wishes, expectations, interests and needs (Norman, 2013). Even with chapters dedicated especially for these two areas, it is important to mention the relevance of UX Research and UCD in the process of involving the academic community in the development cycles of the UA portal.

As it was contextualized earlier in the introduction (chapter 1), the new portal represents not only a break from a model used for 13 years but is the practical example of how it is possible, within the constructivist epistemology (Gray 2004), to meet different individual needs within a new paradigm, where the UA is the developer of the project and at the same time is also the client itself. The fact that the University of Aveiro self-regulates in meeting the requirements that result in the quality of the digital product is another evidence of the adoption of a postmodern posture (McPhee and Zaug, 2000).

From the postmodernist perspective of Lipovetsky (1998), it is also possible to observe the appreciation of individualism in the process of building the new UA portal. Nevertheless, this individualism that Lipovetsky conceptualizes, refers to the sense of concern with the individual and his needs, which according to him, favors the process of personalization of the experience and weakens the rigid structures of organizations, opening space for the construction of empathy and engagement.

2.3 HCI: User needs and requirements

“Human–computer interaction is what happens when a human user and a computer system, in the broadest sense, get together to accomplish something”

(Hartson & Pyla, 2012 p.9)

As a scientific field, information technology is considered relatively new with respect to other areas of knowledge. Mowshowitz & Turoff (2005, quoted by Hartson & Pyla, 2012) surely states that informatics, although new as a discipline, is the area of science that has experienced rapid and profound transformations, and has also provided a vertiginous evolution in research in other areas due to its transversal potentiality. Thus, whether in health, education, infrastructure, agriculture, the environment or any other academy, the Information Technology (IT) has added to these schools' layers and teaching, and research linked to programming, information system, interaction design, information architecture and other requirements not seen so far.

The 1980s, conferences about Human Factors and Computer Systems marked the official emergence of HCI as a discipline in the post-taylorist United States. However, studies by Tatar, Harrison, & Sengers (2007) support the theory that the origin of the HCI was given by the U.S. Armed Forces for military purposes as early as World War II.

Hartson & Pyla (2012) ponder that one of the main contributions of HCI as an area of knowledge was to bridge the gap between engineering and the study of human behaviour. There is no way to appreciate only one area to the detriment of the other. A quality system depends on the well-done integration between the rules of Design, Engineering and Cognitive Psychology. These studies of cognitive psychology enter this process by placing the user as a part of the system, because if it is the user who generates the inputs or other commands in the process of interaction: "User input, if accepted by the system, causes a change in the internal system state and both user and system can cause changes in the external world, for example, move a mechanical part or adjust another system." (Hartson & Pyla, 2012 p. 15).

Upon studying these and other researchers, one realizes that for many years the human continued to be seen as the piece of the system. However, Bailey (1996) argues and points out that "the human is the most complex of almost any system". Author of studies in the area, Bailey ponders that an entire investment in engineering components and state-of-the-art technology is useless if the most complex part of this system, the human, is not connected. This reinforces the need for engineers, developers, programmers, and other professionals involved in HCI projects to turn their attention to the so-called human machine. During interaction with a system success can be to accomplish the desired task, have the problem solved or simply feel satisfied with the use. In other words, human-computer interaction is linked to the intellectual abilities that constitute the whole experience: "Good decision making, problem solving, and reasoning come with experience and constitute what we will refer to as intellectual skill. Systems should be designed to encourage the development and use of the intellectual skills related to the activities to be performed. Two of the most important intellectual processes are problem solving and decision making (Bailey, 1996 p 117). Thus, the intellectual capacity makes the human as a piece of the system, an important part.

2.3.1 Ubiquity and new interaction paradigms

The improvement of new communication technologies has created a new paradigm in the context of HCI. While in the recent past computers and other devices were conceived in a context of restricted access, due to the forms of connection, and other factors, today, in the era of ubiquitous computing (Jenkins, 2006; Lemos, 2005), this interaction between human and computer enables new experiences and new ways of thinking about a human as part of the system. Since the 1980s, the popularization of the Internet has expanded the Interaction paradigms. The boom in sending e-mail messages, and years later, with the connections in social networks, the way of interaction and the way of living in community, made the human not only use the computer, but through this machine, through visual metaphors and icons, communicate with other people. It is the strengthening of the philosophical concept of the machine as a friend of man and the beginning of new patterns of interaction design (Soegaard & Dam, 2015).

By these advances, the physical boundaries between human and machine are rendered so natural and connected that this experience becomes unique. Whether in computers or other devices, a well-designed system makes the contact between user and artifact so broad that interaction with the world changes: “Interaction, however, is doing more than just reappearing in different devices such as we see in Web access via mobile phone. Hartson & Pyla (2012) reaffirm this reality by mentioning Weiser (1991), Russell, Streiz and Winograd (2005): “also talk about the disappearing computer—not computers that are departing or ceasing to exist but disappearing in the sense of becoming unobtrusive and unremarkable” (Hartson & Pyla, 2012 p.14).

In the computing industry, ubiquitous technologies expand in the form of various intelligent objects connected to other computing devices. User empowerment or autonomy are considered new paradigms of computational ubiquity. “Realizing the human-centered vision of ubicomp with these technologies presents many challenges. (...) defining the appropriate physical interaction experience; discovering general application features; theories for designing and evaluating the human experience within ubicomp” (Dix et al., 2004 p.718).

It is evident that cognitive psychology has many connections with studies that deepen the understanding of the human and computer relationship. The human being, with his/her abilities, perceptions, sensibilities and limitations is pivotal within this process of interaction. Hartson & Pyla highlight Card, Moran and Newell (1983) and Norman (1986) are one of the main references for grounded research in this area.

In HCI, specifically in the field of design, interaction should seem obvious: "A good user interface is like an electric light: when it works, nobody notices it." (Hartson & Pyla, 2012, preface). A well-designed system has the feat of making the user unaware of the engineering layer that exists during the interaction process, which makes, from a person's point of view, a very natural contact, as if the artifact were the extension of his own body. On this aspect, not directly related to the computer, but to media technologies, McLuhan (1964) brought to the studies of multimedia communication one of the main philosophical reflections of the area. According to him, this systemic integration between man and technology has the power to "create its own world of demand is not independent of technology being first an extension of our own bodies

and senses" (McLuhan, 1964 p. 80). As the media have converged to computer devices, this reality has become tangible.

By clicking a button, the user wants to perform a task successfully and easily. In his/her mind he/she does not visualize and understand all the complexity of the system. This would be terrifying for many people with the consequence of damaging the relationship between human and computer. For this reason, McLuhan also argued that "All technological extensions of ourselves must be numb and subliminal, else we could not harden the leverage exerted upon us by such extension (McLuhan, 1964 p. 334). What McLuhan called numb and subliminal may be a consequence of a well-designed system, in order to make interaction more friendly and integrated with emotional and cognitive aspects. So, not by chance, Norman (2004) said "that the emotional side of design may be more critical to a product's success than its practical elements (Norman, 2004 p. 5). This argument highlights the relevance of design in two important components: interaction and interface.

2.3.2 Interaction design, according to Norman

In his studies on emotion and Emotional Design, Norman (2004) emphasized that from these interactions with computer devices, the human brain reacts to the external world in three different triggers: visceral, behavioral and reflective.

“Visceral design: Appearance

Behavioral design: The pleasure and effectiveness of use

Reflective design: Self-image, personal satisfaction, memories”

(Norman, 2004 p.39)

Knowing how to work the right dose of each of these levels is the great challenge to stimulate the interaction process, but it is not as simple as a formula. However, final intent must always be directed to make the digital product useful. As a cognitive psychology researcher, Norman (1998) published in another study the precepts that go beyond the sphere of usability engineering. The theoretical concepts presented by him contributed in a fruitful way to several contemporary business models, whether in industry, in the design of info-products and even services, in order to transform the attitude of the productive sector towards its customers or end users.

One of the first debates that the author brought in this field of study was the concept of Affordance, a word of English origin that is presented as a valuable principle of design, whose meaning leads to the offer of correct indications for the operation or interaction with some artifact. To understand the term, the author mentions some examples of the use of simple objects in the routine of thousands of people, among them the glass. By looking at the glass the human being is able to identify its function or utility (Norman, 1998). Namely, the way the author approaches the subject suggests that the concept of affordance is to offer intrinsic indications for the operationalization of objects. In this sense, when an artefact needs many labels and indications of how to use it is a sign that the design can be inefficient or failed. This is also why Norman reports people's difficulties when interacting with simple everyday things, such as opening a door. As a scholar of human behavior, the author demonstrates with a certain tone of criticism (and even revolt), the feeling of guilt that these frustrating experiences provoke in people, and often the mistake is not theirs, but who designed it. These examples with non-computer objects apply to good principles of interaction design for digital products.

Though Hartson & Pyla (2012) are relevant in the field of HCI as they see the human as part of the system, Norman (1998) goes further and deeper to understand how this "part of the system" works in interaction. In order to help us to comprehend how the human being interacts with the world and with things, Norman presents the definition of a Conceptual Model and leads designers to put into practice the exercise of empathy to simulate the mental operations that the user would do when interacting with the object: "people form mental models through experience, training, and instruction"(Norman, 1998, p 17). Thus, it is possible to understand that this process of empathy is essential to understand how people simulate operations mentally. A good conceptual model is a mirror of the mental model because it allows us to predict the effects of our actions. Otherwise: "if the system image does not make the design model clear and consistent, then the user will end up the wrong mental model. (Norman, 1998, p.16). When the system is not well represented and the design model does not convey clarity, it opens a chance for the creation of a wrong mental model. If the model is wrong, the person will be frustrated at the moment of interaction.

Norman (1998) offers other principles, such as mapping and feedback. In the face of the author's line of thought, the principle of mapping can be understood as analogies made from cultural and behavioral patterns of everyday life: "is a technical term meaning the relationship between two things, in this case between the controls and their movements and the results in the world. (Norman, 1998, p.23) This is what makes the user understand immediately even when they do not know an object. The feedback effects provide a visible (sound, tactile, or olfactory) set of actions that direct decision making so that natural mappings can be explored. Good feedback gives the user autonomy to interpret his actions during the interaction process, in order to reach the apex: the feeling of control (Norman, 1998).

When these principles are not respected, the user is frustrated. More than that and wrongly, according to Norman, people attribute the error to themselves or think they are not good at doing the right thing. "If an error is possible, someone will make it. The designer must assume that all possible errors will occur and design so as to minimize the chance of the errors in the first place, or its effects once it gets made. Errors should be easy to detect, they should have minimal consequences, and, if possible, their effects should be reversible." (Norman, 1998, p.47). This is why some models that are created induce errors in everyday situations, because what one has in mind does not always correspond to reality: "In the absence of external information, people are free to let their imaginations run free as long as the mental models they develop account for the facts as they perceive them" (Norman, 1998, p. 39). Therefore, on the basis of a proper mental model, each person creates, according to his experiences with the world, an imagination of his interaction with the object. As a classic example, even without knowing how an ATM terminal works technically, the user can mentally create an image of the system in operation and be successful in his task.

In the awareness that people tend to blame themselves for the difficulties with technology, Norman (1998) takes another view: when people blame the wrong causes. The first tendency is to make a causal relationship between things that happen successfully, which he calls the psychology of guilt. With little information people already tend to make judgments. "In all cases, whether a person is inappropriately accepting blame for the inability to work simple objects or attributing behavior to

environment or personality, a faulty mental model is at work." (Norman, 1998, p.42.) Misinterpretation can be the consequence of a poorly design.

In order to minimize these errors and help designers, Norman highlights the 7 stages of a person's action within the scope of interaction:

1. Goal (form the goal)
2. Plan (the action)
3. Specify (an action sequence)
4. Perform (the action sequence)
5. Perceive (the state of the world)
6. Interpret (the perception)
7. Compare (the outcome with the goal)

These seven stages form, in the author's view, a rough model (not a complete psychological theory) of how people make decisions. He points out that the steps should not necessarily follow this order, as they vary according to needs and opportunities in everyday tasks. Besides understanding these stages, Norman also proposes a reflection on the gaps that separate the mental from the physical state, since they can represent problems of order of execution of tasks or evaluation: "The gulfs are present to an amazing degree in a variety of devices. Usually, the difficulties are unremarked and invisible. The users either take the blame themselves or decide that they are incapable of operating." (Norman, 1998, p.75). The structure of the seven stages presented by Norman is, in its conception, a valuable aid for the design professional, since each stage offers a series of checks considered essential for overcoming the problems related to the gaps.

Consequently, the principles of good design have the following characteristics: visibility (when looking already receive definitions); good conceptual model (consistency in the presentation of operations and results); good mapping (actions and results, control and effects, system and what is visible); and feedback (continuous feedback of information on the outcome of actions).

2.3.2.1 Design Thinking

According to Norman (1998) behavior is determined by the combination of information that is stored in the mind with that found in the world. This behavior does not require great precision of knowledge, naturally this combination will conduct the behavior. On the other hand, but following this same logic, natural constraints are also present, since the physical properties of objects limit operations. However, cultural limitations also interfere with the way interaction happens. These are patterns that are naturally conventionalized. The knowledge that is in the world can minimize the time needed to learn. This is what is known as self-learning: "Because you know that the information is available in the environment, the information you internally code in memory need be precise enough only to sustain the quality of behavior you desire." (Norman, 1998, p.56).

From this premise, the author points out some pitfalls that mislead the design professional and also points out problems related to the market, such as interference in the creative process to the detriment of the most varied pressures and interests. As a solution to this challenge, Norman (1998) presents Design Thinking as a working methodology in which design can evolve by being tested in cycles of problem identification, then presenting solutions, and then new versions, always with the care of knowing where to stop in order to avoid the so-called unproductive changes or those that compromise the project. Ignoring the Design Thinking process, according to Norman, can lead professionals to commit a threat to the cycle: the mistake of putting aesthetics first in order to harm user interaction and satisfaction. "If everyday design was ruled by aesthetics, life might be more pleasing to the eye but less comfortable; if ruled by usability, it might be more comfortable but uglier". (Norman, 1998, p.183). The author points out that it is necessary to fight against a cultural tendency of the designer community to design aesthetically sophisticated objects, but that when it comes to using them alone, they understand. It is understood that this attitude is to neglect usability.

Twenty years later Norman (2010) reiterates the idea that Design Thinking is not restricted to designers. It can be a useful tool for professionals of different backgrounds,

and various business models can take advantage of this process and experience the design.

In continuing Norman's (2010) approach, Bill Moggridge (2010), one of IDEO's founders along with Tim Brown, reinforces the thought that Design Thinking created a new paradigm for creative thinking, as this process turns the subjective aspect of intuition and creativity into tacit and objective knowledge.

While innovation is not the focus of this theoretical context, it is also relevant to mention the relevant studies by A. Cropley, Kaufman and H. Cropley (2011) in which they prove that creativity can be measured.

Thus, Design Thinking expands and maximizes the decision-making process as grounded in dynamic and iterative cycles, resulting in a tangible response.

In this sense, Dam and Teo (2020) add that, while a process, Design Thinking can be extremely useful for alpha projects. The process helps to develop empathy, know the client, predict objections, prototype and test.

The Design Thinking phases (according to the model that we will show below) are so iterative that they can be followed in different ways. Several companies around the world use each in their way an iterative cycle to organize their creative processes.

Dam and Teo present one of the best-known models, elaborated by the School of Design at Hasso-Plattner Institute of Design at Stanford.

This model proposes Design Thinking in five steps:

- Empathise - getting closer to the clients, getting to know the personas
- Define - find the problem, create insights that make clear "why" that summarizes the user's need.
- Ideate - creative step to innovate and think about solutions
- Prototype - create the minimum viable product, prototype the solution
- Test - make your prototype known and tested by your target audience.

The multidisciplinary nature of the teams, as already mentioned, enriches the projects by stimulating creativity. Professionals from different backgrounds perceive the world in different ways. And as Tim Brown explains in his studies on creativity, the environment in teams encourages freedom of thought and creation, without prejudice or judgment.

The point is Norman (2010) argues that all this freedom and naturalness to create and innovate need to be organized systematically. And that is what the Design Thinking proposes.

2.4 Usability: Concept, goals and standards

In the previous section it became evident that Design Thinking is a possible way to create strategies for the development of a user product. It is the way of thinking that helps to understand the user, his/her decisions and needs. Now, the question is to know that this product needs to work, be useful and meet the needs, interests and wishes of the user. In this sense, it is necessary to conceptualize usability. These concepts will be important to better understand the User-Centered Design. In this work, the definitions presented by Nielsen (1993), The International Standards Organization (ISO9126 and ISO 9241-11), The Usability Professionals Association (UPA), Hartson & Pyla (2012), Steve Krug (2014), Tullis & Albert (2008) and Jeff & Crisnell (2008) will be considered due to their relevance as scientific consulting sources.

Before discussing the concepts, it is worth briefly emphasizing the birth of usability from a temporal point of view. Although nowadays it is very much associated with the field of HCI, the concept of usability precedes the use of new communication technologies. Originated from engineering, usability began to be adopted by industry before the manufacture of computing devices. Its adoption in HCI was consolidated parallel to other studies also related to this area of knowledge "We know that computer usability was a topic of interest to some by the late 1970s and, by the early 1980s, conferences about the topic were being established." (Hartson & Pyla, 2012 p.71).

The author who most influenced HCI and Ergonomics conferences, and helped in the propagation of usability, was the researcher Jakob Nielsen (1993), and it is by him that the explanation of the concept begins.

2.4.1 Usability according to Nielsen

Nielsen (1993) proposed a set of guidelines that oriented the procedures to ensure the good use of devices and interfaces, through goals, that is "Usability is a quality attribute that assesses how easy user interfaces are to use" (Nielsen 1993). In addition, the researcher points out that usability also refers to methods directed to turn ease the usage. When evaluating a product according to Nielsen guidelines, every designer should observe the following layers that need to be evaluated: *Learnability, Efficiency, Memorability, Errors and Satisfaction*. In practice, the designer should observe whether users were able to perform basic tasks; whether tasks were performed quickly; whether they learned enough to do the task again; whether they made mistakes and were able to recover from mistakes without help; and whether it was enjoyable to use.

Understanding Nielsen's (1993) proposal, it is remarkable to see how much he was influenced by Norman (1998), and vice versa, because even without speaking exactly about usability, Norman (1998) already criticized the inability to design a product that did not provide autonomy and satisfaction to the user. Bringing to the context of website use, as an example of the empirical stage still to be studied in this research, Nielsen (1993) suggests that a person can access a portal, find the information they want (within an organization by information architecture), comprehend the content they find, have pleasure and autonomy to learn how to use it, even in the face of small errors of initial interaction.

2.4.2 The International Standards Organization (ISO 9126)

Usability, according to Nielsen (1993), has the same meaning within ISO 9126. The difference is that in this parameter, usability is one of the attributes that form a Quality Model for software development. In other words, besides usability, five more attributes

make up the ISO9126: Functionality; Reliability; Efficiency; Maintainability; and Portability.

2.4.3 The International Standards Organization (ISO 9241-11)

Like ISO9126, standards 9241-11 have also helped make the quality of a digital product tangible. Created in 1998, this standard focuses on usability to evaluate performance and satisfaction in three main aspects: effectiveness, efficiency and satisfaction. These three items should be observed from a context of use.

2.4.4 The Usability Professionals Association (UPA)

This association of usability professionals helped expand usability concepts beyond the Ergonomics industry. From discussions and involvement of software companies in the studies, the community of professionals began to focus on aspects more related to users. Thus, it proposed ISO 9241 as an evolution of ISO 9126, and highlighting the concern to meet user needs and expanding the attributes linked to User Centered-Design (UCD).

2.4.5 The International Standards Organization (ISO 13407)

Incorporated in ISO 9214, standard 13407 puts usability from the perspective of evaluation. The contribution of this evolution allowed understanding the paradigm of the usability cycle with a focus on the person-centered design. The idea is to form a strategy that seeks to understand the interaction, test and re-evaluate the product. The goal is to help companies and researchers to perform more tests and make the usability more reliable to the needs of the person.

2.4.6 Usability according to Steve Krug

With a humorous, pragmatism and clearly passionate about usability as an attribute of the user experience (UX), Krug (2014) conceptualizes usability in a simple way. In addition to reinforcing the previous concepts, Krug adds two other features to the concept: Desirable and Delightful. For him, the operationalization cannot be so difficult when the need to use the product, and the same product must offer in its usability attribute these two characteristics. "Do people want it? (...) Is using it enjoyable, or even fun?" (Krug, 2014).

2.4.7 Usability according to Hartson & Pyla

These researchers also highlight usability as a quality attribute of the UX process. "The study of usability, a key component of ensuring a quality user experience, is still an essential part of the broad and multidisciplinary field of HCI. It is about getting our users past the technology and focusing on getting things done for work. In other words, it is about designing the technology as an extension of human capabilities to accomplish something and to be as transparent as possible in the process" (Hartson & Pyla, 2012 preface). UX is known to be a broad territory and in view of the authors' statement, usability is the essential point of the quality of the user experience as a person who depends on an artifact as an extension of his body. Not meeting this need interrupts this synergistic relationship between the digital product or artifact and the user, from this point of view.

2.4.8 Usability according to Tullis & Albert

With a less engineering oriented approach and more user-oriented and everyday experience, Tullis & Albert (2008) also helps to understand usability in different contexts. "Usability plays a much wider role in our lives than most people do. It's not just about using a website, a piece of software, or the latest technology. Usability is about setting up a tent, relighting a furnace to heat a home, trying to figure out a tax form, or driving an unfamiliar rental car. Usability impacts everyone, every day. It cuts across cultures, age, gender, and economic class. Usability takes on an ever-increasing role in our lives as products become more complex. As technologies evolve and mature, they tend to be used by an increasingly diverse set of users." (Tullis & Albert, 2008 p. 6). Thus, these researchers involve the user (as a complex part of the system) as someone capable of taking action, being successful in accomplishing the task. The accomplishment of this task will reflect on the aspects related to UX, a concept that will be addressed in the next section of the theoretical framework.

2.4.9 Usability according to Jeff & Chisnell

Jeff & Chisnell (2008) also believe that usability is "when a product or service is truly usable" (p 4). However, the contribution of these researchers adds two other factors that help conceptualize usability: Usefulness and Accessibility. When talking about the first,

usefulness, the authors point out that the product needs to be useful, means that it is no use and will not be easy and enjoyable, useless. This failure can occur when the team designs more system oriented and less user oriented. Added to this concern is that the product must be accessible to all people, including people with disabilities and making them enjoy the same experience (Jeff & Chisnell, 2008).

2.5 Usability with Accessibility

When discussing the Human Centered Design (HCD) concept, Norman (2018) highlights the importance of focusing on people's needs.

The concern with the needs of the human suggests that, besides usability, another factor also helps in the construction of a satisfactory user experience: the accessibility.

Who needs it

Explaining about the importance of accessibility, Henry (2006) and Cunningham (2012) pointed out that, whether in the content or the functional aspect of the platform, a website must be built to permit access by anyone, independently of whether that person will read or use a screen reader or use a keyboard or a mouse.

Henry (2006) and Cunningham (2012) also emphasized some of the more common disabilities of users in the online environment, namely blindness, low vision, color blindness, hearing impairment, physical disabilities and cognitive disorders (such as dyslexic or ADHD users). For these people, web sites should be designed to support screen readers, easy and clean navigation, and provide other features that make the content truly accessible.

For Dowden, Martine and Michel (2019) accessibility is, in the context of the web, a quality of a website or application designed to serve everyone, with or without disabilities. The disability should be perceived as any physical or psychological disadvantage of the person, whether a chronic or temporary abnormality. When referring to the World Health Organization, the authors "grouped disabilities into six general categories: auditory, visual, physical, cognitive, neurological, and speech. The reality, however, is that disabilities are not this cleanly delineated and will often include aspects from multiple categories" (Dowden, Martine & Michel 2019 p.4).

In other words, accessibility should be treated from a holistic point of view.

Principles and guidelines

Dowden, Martine and Michel (2019) further advise that the development team have to ensure that the digital product is usable. This is possible through the evaluation tools. Even though there are many of them, the temptation to do tests with automatic tools must be avoided. They are useful, but they do not replace the consistency of user testing.

To provide guidelines and resources to support the development of accessible sites, the W3C Web Accessibility Initiative (WAI) (W3C, 2019) describes some solutions related to international standards of accessibility for *Web content*, *User agents* and *Authoring tools*. All of these solutions have to be in accordance with items grouped under the following principles:

- Perceivable information and user interface
- Operable user interface and navigation
- Understandable information and user interface
- Robust content and reliable interpretation

The details of these guidelines are documented in the Web Content Accessibility Guidelines (WCAG) 2.1 (W3C, 2019).

Public policy

International requirements and standards have resulted in advances in web accessibility. However, Dowden & Dowden (2019) argue that a massive number of sites do not encompass accessibility policy; furthermore, it is an ethical premise that programmers, designers and all professionals involved in the development of digital products should be concerned with building a technology that supports people with

disabilities. "Equal access to information, a basic human right as described by the United Nations in section 21 of the Convention on the Rights of Persons with Disabilities (CRPD), becomes even more paramount when looking at global statistics of said individuals regarding health, economic status, and education, all of which show disenfranchisement" (Dowden, Martine & Michel 2019 p.2).

In Portugal, in accordance with the United Nations (section 21 of the Convention on the Rights of Persons with Disabilities CRPD) and with the European directive 2016/2102, the State introduced the "Decree Law No. 83/2018" with specific legislation about Accessibility of the "public sector's websites and mobile applications".

Within the Administrative Modernisation Agency (AMA), the government provided an Accessibility and Usability Kit for public entities in the country to meet usability and accessibility requirements (AMA, 2020). However, each public entity is responsible for the implementation and self-regulation of its usable and accessible web sites.

Both from the scope of usability and accessibility the definitions mentioned here emphasizes the importance of the development of products and services on the Internet that offer users autonomy in responding to their needs.

Despite the pragmatic and functional nature, usability is strongly linked to user expectations. While accessibility is the way to break down barriers and ensure universal access.

2.6 User Experience (UX)

Up until now this theoretical framework has brought the perspective of several scholars in the field of HCI, engineering and design, and has shown with the early days of HCI was immensely human factors in the aspect of usability. However, human experience during the interaction process is not limited to efficiency, effectiveness, learning, satisfaction and other elements that make up the usability attribute.

When something is designed with a focus on meeting the needs of the human, it is therefore possible to speak of UCD because behind the usability itself, there is a delivered and proportionate value. It provides the "user experience". "Because the focus is still on designing for the human rather than focusing on technology, "user- centered

design” is still a good description. We now use a new term to express a concern beyond just usability: user experience.” (Hartson & Pyla, 2012 preface).

As previously mentioned, the postmodernist perspective brought a perspective focused on the particularity of the individual, not only as the complex part of the interaction system, but also on all aspects involving a person's experience during interaction with the product or service (Alben, 1996 quoted by Norman).

It is a fact that usability is one of the attributes of UX. But by observing ISO standards it is possible to detect how the concern with the user experience came to influence standards and guidelines. Hassenzahl (2016) points out ISO CD 9241-210 as evidence of human-centered culture in institutions. Consequently, the ISO CD 9241-210 encompasses "all aspects of the user experience when interacting with the product, service, environment or installation" including the emotions involved in the interaction process, since they are essential for creating links with brands and products (Hassenzahl, 2016).

According to Hassenzahl's assumptions, the subjective evaluations of a product are linked with user feeling. It is like a "psychological coin", says Hassenzahl (2016). And this currency called sentiment information is also valuable for organizations from the point of view of inspiring and enriching the design to offer a product or service that truly "speaks" emotionally to the user. For this reason, the author adds to UX's definition of hedonic quality as "the consequence of fulfilling the human needs for autonomy, competency, stimulation (self-oriented), relatedness, and popularity (others-oriented) through interacting with the product or service (Hassenzahl, 2016 p. 2).

In one of his classic examples, Norman uses the metaphor of Parisian souvenirs in the tourism industry to simplify the understanding of an engaging UX process. In terms of usability, a miniature keychain reproduction of the Eiffel Tower fulfils its purpose: to facilitate the use of keys. But from the point of view of UX, the strong emotional bond associated with a positive experience is what moves the tourist emotionally to make the purchase. Thus, "what matters is the history of interaction, the associations that people have with the objects, and the memories they evoke." (Norman, 2004 p. 57). Following this same theoretical approach, Hartson & Pyla also reinforce that "user experience entails social and cultural interaction, value-sensitive design, and emotional impact-

how the interaction experience includes 'joy of use,' fun, and aesthetics (Hartson & Pyla, 2012 preface).

The deep and pleasurable involvement of the user with a digital product (or any artifact) is the target of every team working on any project. This involvement is like a "psychic energy" (Csikszentmihalyi & Halton, 1981). The concept of "flow" has also made this type of evaluation tangible and even today helps designers to create better strategies to reach this level. When explaining the experience Csikszentmihalyi & Halton (1981) affirm that "In the flow state, you become so engrossed and captured by the activity being performed that it is as if you and the activity were one: You are in a trance where the world disappears from consciousness. Time stops. You are only aware of the activity itself. Flow is a motivating, captivating, addictive state. It can arise from transactions with valued things" (1981 p. 59). With this contribution from researchers, it is evident to perceive the influence of the conceptual and imaginative context that can be created through empathy to attract people. This is another concept that resembles what McLuhan (1964) defined as the perfect stage of objects as an extension of human beings.

2.7 Multidisciplinary aspect of the UX

Despite its breadth, UX can be apply as a strategy. Norman and Nielsen, considered the main references in the area, simplify the concept by giving advice: "The first requirement for an exemplary user experience is to meet the exact needs of the customer, without fuss or bother. Next comes simplicity and elegance that produce products that are a joy to own, a joy to use. True user experience goes far beyond giving customers what they say they want or providing checklist features. In order to achieve high-quality user experience in a company's offerings there must be a seamless merging of the services of multiple disciplines, including engineering, marketing, graphical and industrial design, and interface design." (Norman & Nielsen, n.d.).

This view on UX can explain why companies and organizations have come to value multidisciplinary approaches within their teams. The quality of the experience is crucial. In many projects, people have excellent technological contributions but are unable to provide a good experience, which, according to experts, is ineffective.

Together, professionals from different areas support each other and enrich the process of design, prototyping, design and evaluation. If the great burden of UX is meeting expectations, one of the best advantages is the multidisciplinary and the ease of using resources to get to know and approach the user (Hartson & Pyla, 2012).

2.7.1 The field of UX Research

One of the typical mistakes made by any team during development is to keep the consumer or user away from the construction process. According to Norman (1998), the process addicted look and the distance from the empirical terrain causes professionals to make design and execution mistakes. Instead of assuming what people want (and to make matters worse, they can't even say what they want), Norman suggests that designers simply listen to people. And according to the author, better than listening, is knowing how to observe the user, whether in usability testing sessions or with observation techniques that are more natural for understanding patterns and behavior. Disengaging from "technical sophistication" is avoiding failure (Norman, 1998).

In the context of bringing designers and users together, investment in research can be considered a valuable tool for designing a single digital product that meets people with different needs and cultures. "Satisfying people's true needs, including the requirements of different cultures, age groups, social and national requirements, is difficult. Now add the necessity to cater to the many wants-whims, opinions, and biases of the people who actually purchase products, and the task becomes a major challenge." (Norman, 2004 pp 54). Research aimed at understanding the user experience emerges in this scenario as a solution to the challenge reported by Norman (2004). Whether as a nucleus of researchers, trainers or consultants, the Nielsen Norman Group (founded by Jakob Nielsen and Donald Norman) is among the organizations that disseminate and defend user experience research, UX Research. The research can involve User Testing techniques or simply discreetly observe the user in the environment to understand him.

Also, according to Loranger (2014), many organizations fail to involve the user in the development cycle, and UX Research can generate customer engagement from a political and marketing perspective.

UX Research can be beneficial in helping teams make better decisions as well. Sharing the results can create organizational support around the project under development, reduce production costs and minimize the risk of errors. Since the team is involved in sharing the results, UX Research can be an ally to and avoid rework as designers become more knowledgeable about the client (Farrell, 2017). Referring to the studies of Csikszentmihalyi and Eugene Rochberg-Halton aimed at understanding people's emotional connections to objects, Norman (2004) points out that researchers needed to approach the real context of these people, enter the houses, interview them, and observe them. Although the context is to highlight the aspects of flow and involvement, Norman's mention of Csikszentmihalyi and Halton shows how enriching the UX Research process can be from the point of view of data collection.

2.7.2 UX Research. Methods and new paradigm

“To design the best UX, pay attention to what users do, not what they say. Self-reported claims are unreliable, as are user speculations about future behavior. Users do not know what they want.” (Jakob Nielsen, 2001, First Rule of Usability? Don't Listen to Users, topic Research Methods).

This well-known quote from Nielsen (2001) indicates that, although it seems simple, to observe the user is something a bit complex. In his scientific studies Norman (2001) proved that not everything that people answer when questioned corresponds to reality. The relevant information can be collected from the observation and show contradictions between said answers and observed behaviors. Along with Jonathan Levy, Nielsen was able to prove that people rationalize behavior by giving an opinion, and what they said did not match the behavior observed in the tests (Nielsen & Levy, 1994).

From these scientific findings, Nielsen & Levy (1994) suggested observation under a three-dimensional structure:

- Attitudinal vs. Behavioral
- Qualitative vs. Quantitative
- Context of Use

As a sequence of the study by Nielsen & Levy, (Rohrer, 2014) defined as the main UXR methods, such as: Usability-Lab Studies, Ethnographic Field Studies, Participatory Design, Focus Groups, Interviews, Eyetracking, Usability Benchmarking, Moderated Remote Usability Studies, Unmoderated Remote Panel Studies, Concept Testing, Diary/Camera Studies, Customer Feedback, Desirability Studies, Card Sorting, Clickstream Analysis, A/B Testing, Unmoderated UX Studies, True-Intent Studies, True-Intent Studies, Intercept Surveys, and Email Surveys, as described in the Table 2:

Table 2 Synchronous and asynchronous approaches to UX Research strategies

Usability-Lab Studies	Participants are brought into a lab, one-on-one with a researcher, and given a set of scenarios that lead to tasks and usage of specific interest within a product or service.
Ethnographic Field Studies	Researchers meet with and study participants in their natural environment, where they would most likely encounter the product or service in question
Participatory Design	Participants are given design elements or creative materials in order to construct their ideal experience in a concrete way that expresses what matters to them most and why
Focus Groups	Groups of 3–12 participants are lead through a discussion about a set of topics, giving verbal and written feedback through discussion and exercises
Interviews	A researcher meets with participants one-on-one to discuss in depth what the participant thinks about the topic in question.
Eyetracking	An eyetracking device is configured to precisely measure where participants look as they perform tasks or interact naturally with websites, applications, physical products, or environments

Usability Benchmarking	Tightly scripted usability studies are performed with several participants, using precise and predetermined measures of performance
Moderated Remote Usability Studies (Synchronous)	Usability studies conducted remotely with the use of tools such as screen-sharing software and remote control capabilities
Unmoderated Remote Panel Studies (Asynchronous)	A panel of trained participants who have video recording and data collection software installed on their own personal devices uses a website or product while thinking aloud, having their experience recorded for immediate playback and analysis by the researcher or company
Concept Testing	A researcher shares an approximation of a product or service that captures the key essence (the value proposition) of a new concept or product in order to determine if it meets the needs of the target audience; it can be done one-on-one or with larger numbers of participants, and either in person or online
Diary/Camera Studies	Participants are given a mechanism (diary or camera) to record and describe aspects of their lives that are relevant to a product or service, or simply core to the target audience; diary studies are typically longitudinal and can only be done for data that is easily recorded by participants
Customer Feedback	Open-ended and/or close-ended information provided by a self-selected sample of users, often through a feedback link, button, form, or email
Desirability Studies	Participants are offered different visual-design alternatives and are expected to associate each alternative with a set of attributes selected

	from a closed list; these studies can be both qualitative and quantitative
Card Sorting	A quantitative or qualitative method that asks users to organize items into groups and assign categories to each group. This method helps create or refine the information architecture of a site by exposing users' mental models
Clickstream Analysis	Analyzing the record of screens or pages that users clicks on and sees, as they use a site or software product; it requires the site to be instrumented properly or the application to have telemetry data collection enabled
A/B Testing	Also known as "multivariate testing," "live testing," or "bucket testing". A method of scientifically testing different designs on a site by randomly assigning groups of users to interact with each of the different designs and measuring the effect of these assignments on user behavior.
Unmoderated UX Studies	A quantitative or qualitative and automated method that uses a specialized research tool to captures participant behaviors (through software installed on participant computers/browsers) and attitudes (through embedded survey questions), usually by giving participants goals or scenarios to accomplish with a site or prototype
True-Intent Studies	A method that asks random site visitors what their goal or intention is upon entering the site, measures their subsequent behavior, and asks whether they were successful in achieving their goal upon exiting the site
Intercept Surveys	A survey that is triggered during the use of a site or application

Email Surveys	a survey in which participants are recruited from an email message
Adjusted from NN Group https://www.nngroup.com/articles/which-ux-research-methods/	

It is important to remember that the concept of User testing used in our analysis model is aligned with Levy's definition (2015). It is not about testing the user, but to observe how people "react" to the product conceived or designed. In the UX strategy defended by Levy, the approaches described in the previous table align under the "umbrella" of User testing when we assume that we are "close" to people, either in person or virtually, but synchronously. Thus, when we think of a synchronous usability testing session, the information about what the user does with the product in testing and people's reactions are trivial. However, the reactions and feedback collected during leave valuable clues beyond what could be offered by a rigid list of script tasks.

In the context of the software industry these user experience research techniques are considered the most widely used in procedures that value Human-Centered Design⁶. To analyze user behavior, there are a series of new bots and incoming tools that enhance the data collection process presented by Nielsen, thereby increasing feedback collection. Research shows advances in both textual and even sensory information gathering, as occurs in the wellness industry when collecting data from fingerprints, heart pressure and eye iris recognition. These automatic and intelligent tools have brought about a new paradigm in customer relationships and are characteristic of the recent 4.0 industry (Peruzzini, Grandi, & Pellicciari, 2017). In a positive perspective, obtaining this data can make the experience more personalized and closer to what the person desires.

But before choosing one of these techniques and going out into the field, some scholars warn of the need to know how to manipulate the data collected. What will be useful?

⁶ According to Norman (2018) the term Human-Centered Design differs from User-Centered Design in that it emphasizes the importance of the Design Thinking process centered on the human being not only as a user/consumer, but as someone where the Design Thinking process begins, focusing on what the person desires and how the person can be fully satisfied.

What insights can be taken forward? What can be implemented? Is it contemplating accessibility?

Requirements can help in meeting these questions. It is common for organizations to focus their efforts on meeting the functional requirements of the system, but user needs, including usability and accessibility, and policy requirements must not be forgotten. Are the steps taken in accordance with the requirements inherent to what the project needs to be developed? It is this reflection that together with other authors Dix (2004) provide in their studies. "We begin by capturing and analyzing requirements, but we need to do this within the work context, taking account of the complex mix of concerns felt by different stakeholders and the structures and processes operating in the workgroups. (...) we consider several approaches: socio-technical modeling, soft systems methodology, participatory design, ethnographic methods and contextual inquiry" (Dix et al., 2004 p. 458). These are issues that reflect on the organizational point of view, in order to facilitate the fulfillment of the expectations of the stakeholders involved and ensure the robustness and sustainability of the development project.

To reflect on the connection between the UX Research practices and their social context of applicability permits to establish the HCI studies in the new social dynamic and to comprehend the transformations that this phenomenon has caused. The perspective of the authors introduced here reveals a society configured in a new collective intelligence where various social actors are involved in co-designing processes.

In the context of the development of digital products this theoretical review emphasizes that the participatory culture inherent to postmodern society promotes iterative cycles of development in HCI, multidisciplinary teams, adoption of approach and empathy strategies towards the stakeholders, greater agility to identify problems and opportunities, and a more rigorous commitment to attend the usability and accessibility requirements, thereby contributing to a better user experience. Moreover, it allowed the theoretical background of the procedures adopted in the empirical stage of research.

Chapter 3 - Contextualizing the methods, data collecting and participants

The objective of this chapter is present an overview of the empirical phase of the research, contextualizing the methods of data collection, the participants involved in all stages of the evaluation process in the News area, and the intentions that motivated the use of each UXR source as a strategy for collecting data from general users or institutional agents involved in the decision-making process. This Demonstrates the effort made by the portal team to listen to people from different profiles, through several ways to find the users' needs. In addition, reflect the efforts to develop a digital product with good usability and accessibility practices.

The pursuit to fulfill the user's needs is an inherent practice in digital product development. But in the case of the new UA Portal there is another factor for this demand. As a public entity, UA has to comply with different laws and regulations, namely with the usability and accessibility requirements prescribed by The Administrative Modernisation Agency (AMA).

The work done within the UXR routine made it possible to apply for the new UA Portal for the Gold Seal of Usability and Accessibility (AMA, 2020), offered by AMA to governmental institutions that demonstrate the efforts to develop digital products with good usability and accessibility practices. One of the conditions required by the AMA for the application is testing with both users without disabilities and with disabilities. In the case of the UA portal, the blind and accessibility experts had a crucial role in testing and validating the portal's new sites in order to help support accessibility requirements.

By the time this dissertation was published, the result of the application process for the Gold Seal of Usability and Accessibility had not been released by the Agency. It is worth mentioning that before the application to the AMA competition, the new UA Portal already had on its pages the W3C compliance seals concerning the guidelines described previously, in section [2.5](#) of the chapter on the theoretical framework.

In this chapter we will summarise how we have collected the data from each UXR source in the evaluation process of the new portal: User Testing, Automatic Analysis

Tools, Stakeholders Meetings, and Extra Input. The analysis of the data obtained will be then detailed in [Chapter 4](#). It is important to reiterate that other UX Research approaches were carried out in the context of developing other stages of the new AU portal project. But here it will be presented only what was performed specifically related to the news area, in a summarized way.

3.1 User Testing

The main objective of the User Testing was to understand the interaction of users with the portal's new News area and detect possible improvement points inherent to the basic navigation journey, such as the simple act of accessing the news area link, identifying the organisation of information, reading a content and sharing it. Based on these objectives established by the portal team, we sought to standardize tasks to be observed by different audiences, as is described on Table 3:

Table 3 Methodological summary of the User Testing Sessions

User Testing Sessions	
Tasks	<ol style="list-style-type: none"> 1. View the entire homepage, from top to bottom (recognition phase) 2. Identify the institutional highlights of the portal's home page 3. Access the new portal's news site 4. Identify featured news 5. Click on a news item 6. Back to the main page of the news site 7. Read more news from a news page 8. Identify the content categories menu of the news site 9. Find button see more 10. Share a news
Method	Think Aloud Protocol
Measurement	Indicators described by Analysis Model (table 1, in section 1.3)

Environment	Testing Room (as a lab)			
Register	Video audio recording and Taking notes			
Devices	Desktop		Desktop + NVDA Assistive Software	
Sample representation (chosen by convenience)	Usability focused		Accessibility focused	
	5 workers (from Departments and Services)	5 new students (from 1st cycle)	3 library accessibility experts (not blind)	3 rectory employees (blind)
Date	Sep 11, 2019	Sep 12, 2019	Nov 25, 2019	Jan 24, 2020
Sprint	13	13	18	21
Findings related to (Problem Typology)	1 Social Presence 1 Inf. Architecture 18 Visual 27 Interaction		3 Bug 12 Visual 15 Interaction 18 Inf. Architecture	3 Bug 6 Inf. Architecture 9 Visual 18 Interaction
Requirements Supported	1 Political 46 Design		48 Accessibility	36 Accessibility
Total of 131 inputs per Problem Typology	1 Social Presence 6 Bug 25 Inf. Architecture 39 Visual 60 Interaction			
Total of 131 inputs per Requirements Supported	1 Political 46 Design 84 Accessibility			

The results obtained from users who represented people without disabilities allowed the identification of issues related to failures in visual design, in the functioning of micro

interactions and feedback elements. Table 3 summarizes the main needs and problems identified (Table 4) and the solutions that were developed based on what was identified during the tests:

Table 4 Usability Testing findings and solutions classified per typology of problem

Findings types	Solutions Types	Problem Typology related
Difficulty to return to the top of the page	<i>Back to top button</i>	Interaction
Image without link assignment	<i>Highlights images as a link</i>	Visual
Difficulty returning to the News area homepage	<i>Title sizing from 16px to 28 px and keyboard navigation route adjust</i>	Interaction
Unwanted dropdown effect on clickable title "News" on mobile	<i>The title has been removed from the clickable zone to preserve the consistency of the title as a link to the home page on mobile, just as it is on desktop</i>	Interaction
Difficulty interacting with sharing icons due to spacing and size	<i>Extend the spacing between social media icons</i>	Interaction
Absence of icon that allows sharing by email and other social networks	<i>Inclusion of "share url" to the icon set</i>	Interaction
Difficulty to find the news category menu	<i>Resize (expand) the bar and the font of clickable titles</i>	Visual Interaction
Link without working in the pretitle of the news	<i>Pretitles (categories) working as a link</i>	Interaction
"+" button no working as a link in the area of institutional highlights of the portal homepage	<i>"+" button working as a link</i>	Interaction

Once the UA portal was evaluated with users who represented the audience (through the choice of representatives of sectors and departments and groups) without disabilities, as well as the correction of the detected problems, two batteries of tests

focused on accessibility were then made. One with the library's experts and the other with the blind staff who work in the rectory, following the same task guide.

The results were important to help correct distortions regarding the navigation sequence with the keyboard, the way the blind operate the assistive technologies to navigate on the internet. As shown in Table 5, the tests were relevant to improve aspects related to the alternative description of images and the arrangement of clickable icons:

Table 5 Accessibility Testing findings and solutions classified per typology of problem

Findings Types	Solutions Types	Problem Typology related
Sharing button in the middle of the text makes understanding difficult	Reorder the navigation sequence	Architecture Information
Social networking icons between the title and the text generate reading obstacles	Disable access to the sharing icons between the title and the text and keep only those at the end of the text	Interaction
Associated agenda generates obstacle between the title and the text	Reorder the agenda sequence to the end of the news	Architecture Information
Use of abbreviations and acronyms without explaining makes it difficult to understand the information	Advise journalists and content producers about good practices	Visual
The position of the news data interrupt the reading	Make the term "publication date" more evident at the alt of the link	Interaction
Bug: Sometimes navigation sequence with keyboard jumps from the title of the news directly to the footer of the page	Correct the script	Bug

In this section a context of User Testing sessions with people with and without disabilities, and their results, was presented in order to clarify the processes, the people involved, and the contributions obtained.

3.2 Automatic Analysis Tools

In the analysis model we explained that the use of an Automatic Analysis Tool, Hotjar (www.hotjar.com), was another form of data collection chosen by the UA Portal team, and consequently was considered in this study as one of the UXR sources to data gathering from end-users. As illustrated in Figure 14, Hotjar offers six ways to collect the data, either through Heatmaps, Recordings, Funnels, Forms, Incoming or Survey:

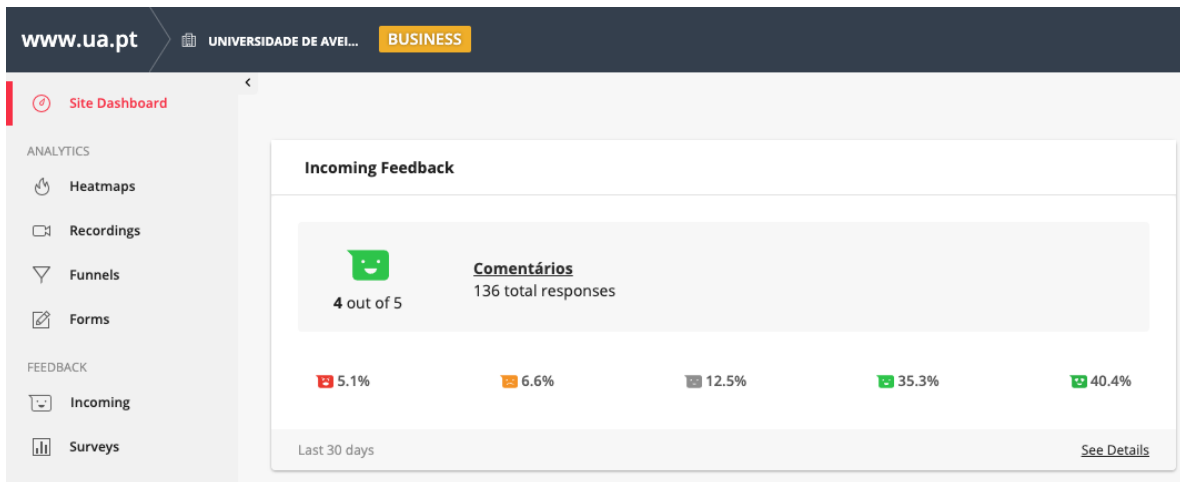


Figure 14 Hotjar dashboard with the functionalities on the sidebar

Despite the functionalities available in Hotjar, we chose to use the function Incoming, as the dashboard shown in Figure 14. This feature works as a feedback floating button embedded on the page (Figure 15).



Figure 15 User perspective of the Hotjar incoming button embedded on the UA Portal

It is on this button where visitors click to send feedback. When it is sending, the Hotjar software provides us with the inputs from the users, such as the visited page URL, print screen and email address (when the user allows), as well as other data, like information about the country of origin of the ID visitor (identification number), type of device (if the visitor used tables, smartphone, laptop or desktop) and the browser (Figure 16).

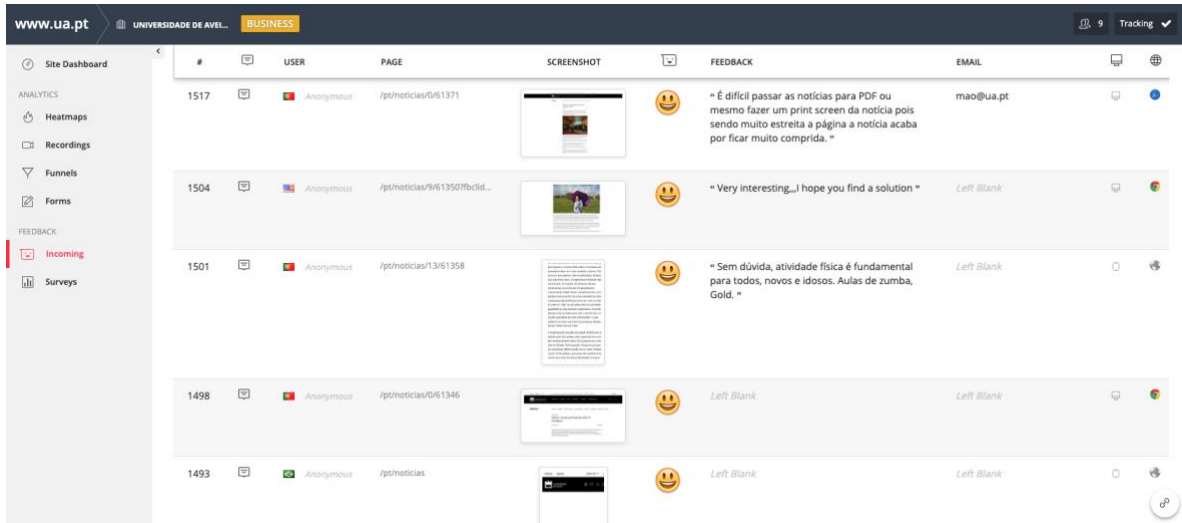


Figure 16 Researcher perspective of the incomings/messages from users via Hotjar income button

The messages received via Hotjar's feedback button about the News area totaled a number of 144 inputs (Table 6). 15 of these inputs represent messages from visitors who could not interact with the content because of some bug. These problems, when detected, were forwarded to the development team to identify and solve the problem.

Table 6 Methodological summary of data collecting via Hotjar

Automatic Analysis Tools (Hotjar)				
Register documentation: Data tabulation on Sheets (Google Sheets/Excel) Data processing in SPSS				
Date	Sprint	N. of Inputs (feedbacks)	Typology	Solution
16 to 23/Oct/2019	15	18	1 Bug 14 Social Presence	1 Bug issue correction
25/Oct to	16	16	14 Social Presence	-

5/Nov/2019				
7 to 20/Nov/2019	17	22	6 Bug 11 Social Presence	6 Bug issue corrections
21/Nov to 1/Dec/2019	18	21	2 Bug 18 Social Presence	2 Bug issue corrections
5 to 18/Dec/2019	19	16	4 Bug 12 Social Presence	4 Bug issue corrections
20/Dec/2019 to 15/Jan/2020	20	24	1 Bug 21 Social Presence	1 Bug issue correction
16 to 29/Jan/2020	21	11	10 Social Presence	-
1 to 12/Feb/2020	22	8	1 Bug 7 Social Presence	1 Bug issue correction
12 to 22/Feb/2020	23	8	8 Social Presence	-
Total		144		15 Bug issue corrections

The other inputs were classified as Social Presence typology because consisted of comments related to the news content.

For this reason, neither of the two typologies identified contributed to support the requirements for the UA Portal. As the feedback checking received via Hotjar was part of the portal daily routine, matters related to news or institutional content were forwarded to the rectory or the University Communication Services. Likewise, the bugs did not help in the defense of requirements because they were occasional computer events that occurred during updates made to the portal. They were corrected without affecting the development technologies.

3.3 Stakeholders Meeting Inputs

Meetings with stakeholders (Table 7) were also used as a way to obtain inputs. These were meetings planned by the project coordination to discuss design changes, to share results of usability and accessibility tests, and to get feedback from those involved as institutional agents who influence the decision-making process, since they represent departments, schools and university services.

Table 7 Methodological summary of data collecting during Stakeholders Meetings

Stakeholders Meetings Inputs							
Register documentation: Field diary notes, photos, and video recording Data tabulation on Sheets (Google Sheets/Excel) Data processing in SPSS							
Date	Sprint	N. of inputs	N. of participants	Participants work sectors	Typology	Requirements	Solution
25/Sep/2019	13	5	11	Information and Technologies Services; Communication Services; Rectory	1 Inf. Architecture 4 Visual	1 Political 4 Design	4 Adjustments
26/Sep/2019	14	2	6	Communication Services	2 Inf. Architecture	2 Political	2 Adjustments
10/Oct/2019	15	13	40	Pivots from Departaments, Schools and Services	1 Visual 2 Inf. Architecture 4 Social Presence 4 User experience	1 Design 8 Political	-
9/Jan/	20	12	3	Customer Service	12 User	-	Sharing the

2020				(Operated by blinders from Communication Services)	experience		feedback of the blind, as end users, to the team awareness
Total		32	60				

As described in Table 7, these meetings were important for identifying needs, supporting product requirements (mainly political scope) and providing solutions. Because it involved a large number of agents representing the various university areas, it was common to deviate from the subject to themes related to the institution and not exactly to the digital product in question. Therefore, complaints related to the university and not to the portal were not used in the statistical analysis of the data.

3.4 Extra Inputs

We explain in section [1.3.1](#) of the analysis model that the Extra Inputs were aggregated in a UXR source category created to show the data obtained through strategies created to meet eventual demands of the UA Portal’s Evaluation team. At specific times it was necessary to consult a specialist; in others, the team had to obtain data through social networking (Facebook) or message app (Teams) to understand situations that needed a look beyond what was seen in the evaluation routine. The Table 8 summarizes the three moments when this was necessary.

Table 8 Methodological summary of data collecting via Extra Inputs

Extra Input Sources						
Register documentation: Field diary notes, report, and print screen Data tabulation on Sheets (Google Sheets/Excel) Data processing in SPSS						
Date	Sprint	Collect from	N. of inputs	Typology	Results/Actions	

18/Sep/2019	13	Comments on the Teams App	1	1 Visual	1 Adjustment
16/Oct/2019	15	Facebook posts	21	1 Information Architecture 1 Bug 2 Interaction 3 Visual 14 Social Presence	1 Correction 2 Adjustments
9/Fev//2020	23	Expert Review	42	1Ux 1 Bug 3 Social Presence 3 information Architecture 13 Interaction 21 Visual	4 Adjustments 13 Corrections
Total			64		

In sprint 13, the period before the launch of the new News area, an extra input was collected via comments from a stakeholder in the rectory. It was useful for the portal team to make adjustments before the launch.

In sprint 15, after the launch of the new News area, the collected input represents comments originated from a post in the Facebook of the new Portal project coordinator. The idea was to take spontaneous feedback to identify opportunities for improvement. Finally, in sprint 23, the opportunity was taken to access a specialist who as a university Alumni collaborated with a review, at the invitation of the evaluation team.

Chapter 4: Description and Analysis results.

As explained in the analysis model (Table 1), the concepts User Testing, Stakeholders Meetings Inputs, Extra Input Sources and Automatic Analysis Tools were conceptualized as the four UXR sources, during the sprints 13 to 23, as evaluation strategy of the new News area.

The descriptive statistical analysis was adopted to help understand the frequency of data distribution per occurrence, with the use of cross-data tables (indicated in each section of this chapter) developed to understand the correlations between the variables.

If the overriding research objective consisted in discover which nature of the data sources (inputs obtained in the UXR: User Testing, Stakeholders Meetings Inputs and Automatic Analysis Tools) most contributed to the solutions developed (outputs), the values processed in the SPSS represent, therefore, the numbers of inputs obtained from those four data sources.

4.1 The testing of the Main Hypothesis

In the section [1.8 of the introduction \(Chapter 1\)](#), we explain that this research was motivated by one main hypothesis and three sub hypotheses. We will start in this section the description and analysis of the results concerning the main hypothesis: each UXR source has a different capability for gathering data about the user needs.

The null hypothesis (H0) accepts there is no significant difference between the number of inputs (capability) collected by the four data sources: User Testing, Stakeholders Meetings Inputs, Extra Input Sources and Automatic Analysis Tools. It means that the null hypothesis assumes the same amount (capability) of inputs generated from the four UXR sources.

The alternative hypothesis (H1) presumes the number of inputs generated by the four data collection sources is different from each other. That is, each source had several capabilities to collect data in the UXR process.

4.1.1 Rejecting null hypothesis

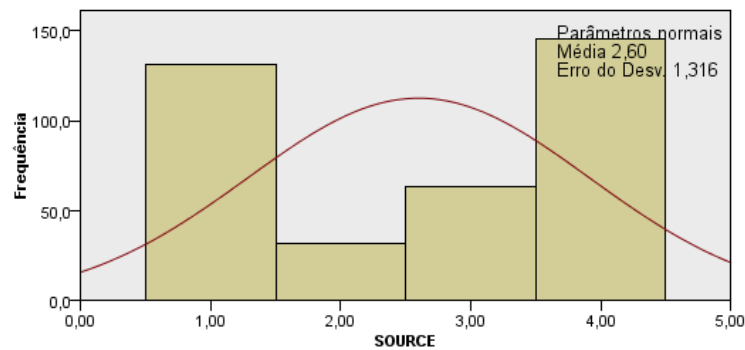
After the data processing, with a 95% confidence level, it was possible to accept the alternative hypothesis (H1).

Applying the qui-square test to this sample set, it was found that with Sig 0.00, the null hypothesis was rejected (Table 9 and Graph 1). Thus, there is a significant difference in the quantity of inputs generated by each of these UXR sources.

Table 9 Normality tests by Correlation of significance of Liliefors

		Normality Tests					
SOURCE		Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistics	gl	Sig.	Statistics	gl	Sig.
SPRINT	USER TESTING	,258	131	,000	,783	131	,000
	INPUT STAKEHOLDERS	,326	32	,000	,758	32	,000
	EXTRA INPUT SOURCES	,417	63	,000	,620	63	,000
	AUTO AN TOOLS	,120	145	,000	,946	145	,000

Kolmogorov-Smirnov sample test



Graph 1 Distribution of the amount of inputs provided per type of UXR source. The four UXR sources were labeled in numerical (quantitative) data. User testing (number 1), Stakeholders Meeting (number 2), Expert review (number 3) and Automatic Analysis Tool (number 4).

This confirms that each nature of data collection source (User Testing, Stakeholders Meetings Inputs, Extra Input Sources and Automatic Analysis Tools) within UXR had a specific potential in generating inputs.

4.1.1.1 The testing of the three Sub Hypothesis

The analysis model built for this research asks for three sub hypotheses to be observed:

1. The UXR sources have different capabilities to meet the requirements.
2. The UXR sources have different capabilities for identifying problem typologies that each UXR source contributes differently to generating outputs (or product solutions).
3. Each UXR source contributes differently to generating outputs (or product solutions).

Thus, the following graphs also demonstrate that there was a significant difference between hypothesized and observed values when asked:

1. Are the four development requirements (Accessibility, Design, Political and Technical) equally met by the data collected by UXR sources?
2. The six types of problems related to interface dimensions (Information Architecture, Bug, Interaction, Social Presence, UX and Visual) are also detected by the UXR sources?
3. The four output process solutions (NONE, Adjustment, Correction and New Feature) have been equally distributed to meet the needs identified by the UXR sources?

Asking these questions can help us reflect on:

1. The requirements that URX sources can help the team to ensure the product's quality
2. The types (typology)of problems related to interface dimensions that UXR fonts most help to detect
3. Understand the nature of the solution undertaken to respond to the user needs identified by the UXR sources.

In facing these questions, the same statistical Chi-Square test was performed with the collected data samples corresponding to each of the three questions. Thus, we sought to understand how the URX methods chosen by the portal team helped in supporting the requirements, in identifying the types of problems related to the interface dimensions and in perceiving the types of solutions/outputs as a response to the identified needs. In these three tests specifically, only valid cases were considered:

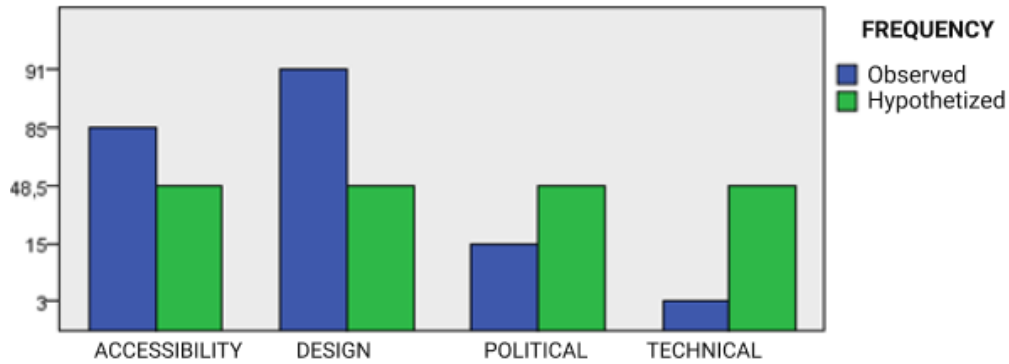
1. Development requirements: 194 valid cases (inputs that generated some type of constraints to the development requirements).
2. Typology of problem: 360 valid cases (inputs that represented some problem of the interface dimensions).
3. Delivered solution: 176 valid cases (inputs that demanded output/delivery solution)

This is therefore the valid data considered for analysis.

4.1.2 Sub hypothesis 1: Null hypothesis rejected (Supported Requirements sample).

The affirmation of sub hypothesis 1: The UXR sources have different capabilities to meet the requirements, was confirmed.

With a 95% confidence level, it is possible to say that the null hypothesis is rejected, that is, the development requirements are not equally met. The UXR fonts used by the UA portal most helped to support the design requirements (91 valid cases) and accessibility (85 valid cases). Although less frequently, the political and technical requirements were met, with 15 and 3 valid cases, respectively. This shows that if the hypothetized values were true, the Accessibility, Design, Political and Technical requirements would have been equally supported by an average of 48 inputs each (Graph 2).



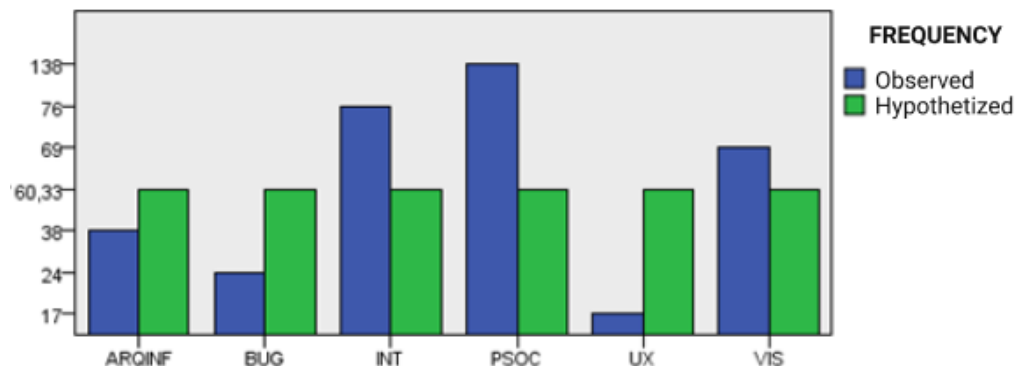
Graph 2 Frequency of 194 valid cases (Sig,000)

This may reveal that the UXR sources used throughout the evaluation of the news area of the UA portal had the potential to support the two requirements that are more related to the interaction environment, where the usability and utility of the digital product are most in demand. But still, data collection can help, even if timidly, to detect constraints from a political and technological point of view.

4.1.3 Sub hypothesis 2: Null hypothesis rejected (Typology of Problems sample).

The affirmation of sub hypothesis 2: The UXR sources have different capabilities for identifying problem typologies, was confirmed.

With a 95% confidence level, it is possible to state that there is a significant difference between the types of problems detected in the interface dimensions, thus rejecting the null hypothesis.



Graph 3 Frequency of 360 valid cases (Sig,000)

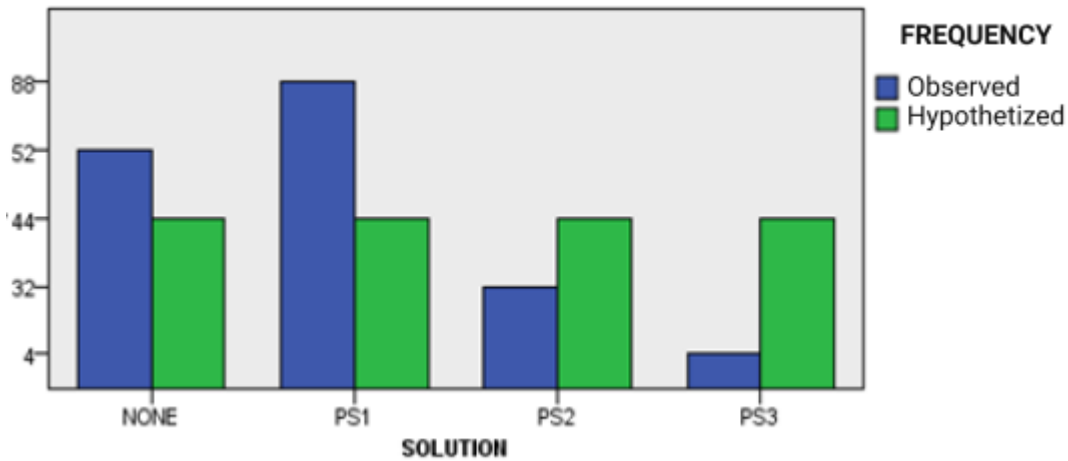
Most of the data collected (Graph 3) helped to identify feedbacks related to Social Presence (PSOC), i.e., feedbacks that were related to how the user views the university or the news. We believe that these 138 inputs are the result of the very nature of the digital product evaluated because in the News area people interact with content that touches social issues. These were moments when users referred to the institution or subject of the news, and not directly to the interface. Secondly, the 76 valid cases represent the feedback related to the interaction problems (INT) in the interface of the news area. Then, with 69 valid cases, the UXR sources helped in the identification of visual dimension (VIS) problems of the interface.

Below the estimated are the occurrences of problems related to Information Architecture (ARQINF) 38 valid cases, Bugs (BUG) 24 valid cases, and problems related to UX 17 valid cases. It is expensive that all problems interfere in UX, and so the frequency in this dimension could have been much higher. But as explained in the methodology chapter, to avoid duplication of inputs, only extreme situations were considered, where users manifested explicitly emotional evidence.

4.1.4 Sub hypothesis 3: Null hypothesis rejected (Product Solution sample).

The affirmation of sub hypothesis 3: Each UXR source contributes differently to generating outputs (or product solutions), was confirmed.

With a 95% confidence level, the null hypothesis was rejected in the Chi-Square test. In the decision-making process, the solutions while responses to the problems were not distributed in the same way (Graph 4).



Graph 4 Frequency of 176 valid cases (Sig,000)

In the output process, the portal team was much more dedicated to making adjustments to the interface elements (PS1, 88 valid cases). Then, 52 valid cases represent the team's decision to do nothing (NONE). These are situations where inputs were welcome, but for reasons of time, priorities, resources and policies, the option was not to make changes at that time.

Underneath the hypothesized are the other two outputs. PS2, which represents the corrections made to meet 32 inputs. And finally, PS3, which were the four responses to the inputs that demanded the creation of New Feature.

As is described in the (Graph 4), the fact that the inputs demanded more Adjustments (PS1) than Corrections (PS2) and New Features (PS3) may be an indication that the digital product developed was close to the users' expectations and needs. It demonstrates that the team knows its user to the point of drawing much closer to the user's needs. It suggests that in an Agile development environment, iterations of UXR approaches can be powerful tools to promote stakeholder involvement in the co-design process and for the team to know the user more deeply.

4.1.5 Recapping Chi-Square Tests

In this first part, we discuss the results of the hypothesis test with the main question. The result was that the null hypothesis was rejected in the statistical test and proves that each UXR source built differently to help meet the identified user needs.

The Chi-Square tests also helped us to test the three secondary hypotheses. And in all three cases, the null hypothesis was rejected.

Regarding the Requirements support, it may mean that the chosen UXR fonts helped to support first the Design Requirements, secondly the Accessibility, thirdly the Political-institutional and fourthly the Technical Requirements.

In what concerns to the identification of which interface problems the UXR fonts most helped to understand our results showed: first, issues related to Social Presence, second, Interaction problems, third, problems of Visual dimension, and fourth, problems of Information Architecture, following from Bugs and interface issues of the new User Experience related news area.

Finally, regarding the types of Solutions that most demanded decisions from the team to meet the needs identified by the UXR sources, the results showed first the Adjustments, second the NONE decision (do nothing), third the Corrections and, last, the development of New Features.

4.2 General data distribution

Together the four UXR sources User Testing, Stakeholders Meeting Inputs, Extra input Sources and Automatic Analysis Tools contributed to the collection of 371 inputs over the sprints. These include complaints, compliments, tasks completed, tasks not performed and other user-needs observed from the indicators of the analysis model.

Obviously, if other indicators were chosen, such as facial expressions and other types of data, the number of inputs generated would be much greater than the amount of 371. This indicates that the choice of indicators for the analysis model can restrict or increase the sample volume. It also reveals how deep and complex the URX approaches

are for data collection, as there are a variety of elements from the contextual, environmental, anthropological, ethnographic, and behavioral aspects during an interaction. Depending on how the indicators are defined, according to the target, the number of inputs can be huge or even very high.

In the table below (Table 10) the frequency of data collected by each of the four UXR sources is distributed in 11 sprints (13 to 23). It is important to emphasize again that these sprints represent the period dedicated to evaluations, testing and feedback collection during the pre-launch, launch and post-launch of the UA portal news area.

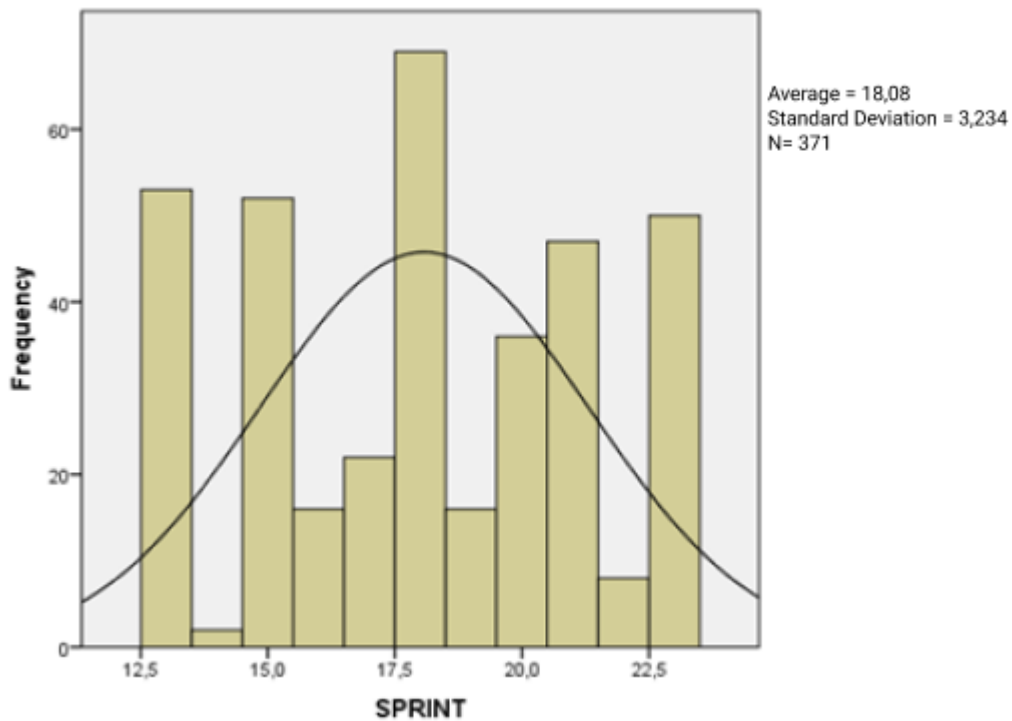
Table 10 Frequency of UXR Source distributed over the sprints observed

Cross tab

		UXR SOURCE				Total
		USER TESTING	INPUT STAKEHOLDERS	EXTRA INPUT SOURCES	AUTOMATIC ANALYSIS TOOLS	
SPRINT	13	47	5	1	0	53
	14	0	2	0	0	2
	15	0	13	21	18	52
	16	0	0	0	16	16
	17	0	0	0	22	22
	18	48	0	0	21	69
	19	0	0	0	16	16
	20	0	12	0	24	36
	21	36	0	0	11	47
	22	0	0	0	8	8
	23	0	0	41	9	50
Total		131	32	63	145	371

It is clear that the distribution of the inputs collected throughout the digital product evaluation process was not equal or proportional among all sprints. The sprints with the highest input are those where the UXR methodology has been characterized by being

closer to the end-user's field, such as interviews or usability tests. In the sprints where the entries were smaller, are the period in which the team dedicated to the reflection of results, generation of insights and was more focused on the implementation of solutions. Thus, in the data analysis phase, the team chose faster UXR methods to be applied, such as expert review or stakeholder consultation to validate some decisions.



Graph 5 Distribution of all inputs along the 11 sprints

The bars of the frequency distribution graph (Graph 5) helped us to better visualize the alternation between peak moments when more data was collected, alternated with the moments of the lower peak when the collection was less.

The following table shows the frequency distribution of the same data, only rolled by type of indicator used to collect the inputs from the respective UXR sources (Table 11).

Table 11 Crosstab of valid indicators

		VALID INDICATOR * SOURCE				Total	
		UXR SOURCE (INPUT)					
INDICATOR		USER TESTING	STAKEHOLDERS MEETINGS	EXTRA INPUT SOURCES	AUTOMATIC ANALYSIS TOOLS		
INDICATOR	Complaint (AT)	0	0	0	39	39	
	Compliments (AT)	0	0	0	105	105	
	Social network post (EX)	0	0	21	0	21	
	Comments on Teams (EX)	0	0	1	0	1	
	Expert review/comments (EX)	0	0	41	1	42	
	Compliments (SM)	0	14	0	0	14	
	Complaint (SM)	0	3	0	0	3	
	Suggestion (SM)	0	9	0	0	9	
	Need (SM)	0	6	0	0	6	
	Number of clicks (UT)	2	0	0	0	2	
	Clicked zone (UT)	3	0	0	0	3	
	Tasks not performed (UT)	11	0	0	0	11	
	Compliments (UT)	24	0	0	0	24	
	Complaint (UT)	78	0	0	0	78	
	Suggestion (UT)	10	0	0	0	10	
	Doubt (UT)	1	0	0	0	1	
	Time spent (UT)	2	0	0	0	2	
	Total		131	32	63	145	371

It is worth to say that not only the quantity and type of indicator differ between UXR sources, but also, not all of the indicators provided in the analysis model has been used in the collection of inputs in each of the UXR sources. For this reason, we will discuss below both the validity and the omitted indicators.

4.2.1 Valid Indicators

All the indicators foreseen in the analysis model as a data collection tool are considered valid and have been accounted for by occurrence.

4.2.1.1 User Testing Indicators

According to table 3 in section [3.1](#), 4 User Testing sessions were performed. Two of them occurred in Sprint 13, focusing on usability. The other two were performed in Sprints 18 and 21, with a focus on accessibility issues.

Valid indicators:

The following are considered valid indicators: Complaints, Compliments, Task not performed, Suggestions, Clicked zone, Number of clicks, Time spent, and Doubts.

Complaints

The way used to measure the inputs coming from User Testing show how powerful this approach is to evaluate and get to know the personas, and how the user considers the digital product and relates to it. In this source of UXR, the reports led 78 inputs and are an obvious way to understand the user's dissatisfaction.

Complaints can also be an indication of an exact, unmet need or some difficulty.

"It is necessary to have eagle eyes. (It takes so long to find) I was going to drink a coffee."

"É necessário ter olhos de águia. (É tão demorado para encontrar) Eu ia beber um café." (in portuguese language)

"There has to be another option. Maybe I'll come here and give up."

"Tem de haver outra opção. Se calhar eu venha aqui e desista." (in portuguese language)

These were complaints from different users about the difficulty in finding the news agenda, during the usability testing, in September 2019.

Compliments

Compliments (24 inputs) were the second most used indicator in this source. This indicator was considered because the act of praising some aspect of the digital product can be evidence that met some latent need or expectation.

"The topics organize the news. I like that because I have the overview and go to what interests me most."

"Os tópicos organizam as notícias. Gosto disso porque tenho a visão geral e vou ao que mais me interessa." (in portuguese language)

Compliment from User during Usability Testing in September 2019

The other testimonials can be checked in the [Appendix 1.1](#) (User testing Grid Analysis).

Task not performed

Third, are the tasks not performed (11 inputs) in the usability and accessibility tests. These results are essential to understand the most difficult moments of the journey, when at some point during the execution of the tasks of the usability test the user was not able to reach the final objective proposed.

Table 12 Tasks not completed

Tasks	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
T1										
T2										
T3										
T4										
T5										
T6										
T7										
T8										

T9										
T10										
Performance	90%	100%	100%	90%	90%	90%	90%	80%	90%	100%
Total time spent	8:02	5:27	4:57	7:05	11:05	8:30	10:03	10:59	10:31	9:23

Suggestions

Suggestions (10 inputs) is a very interesting indicator because a suggestion can mean a polite way to complain about something that is not working very well or needs improvement.

"There could be a button to help you get back to the top."

"Poderia haver um botão para o ajudar a voltar ao topo." (in portuguese language)

A suggestion from ser during Usability Testing in September 2019.

Clicked zone

The Clicked Zone (3 inputs) is a typical usability indicator where the focus is to evaluate the interface interaction components, based on a task intentionally created to understand user behavior. This indicator was used only in a single usability test when the intention was to understand which interface elements received more clicks (Figure 17).

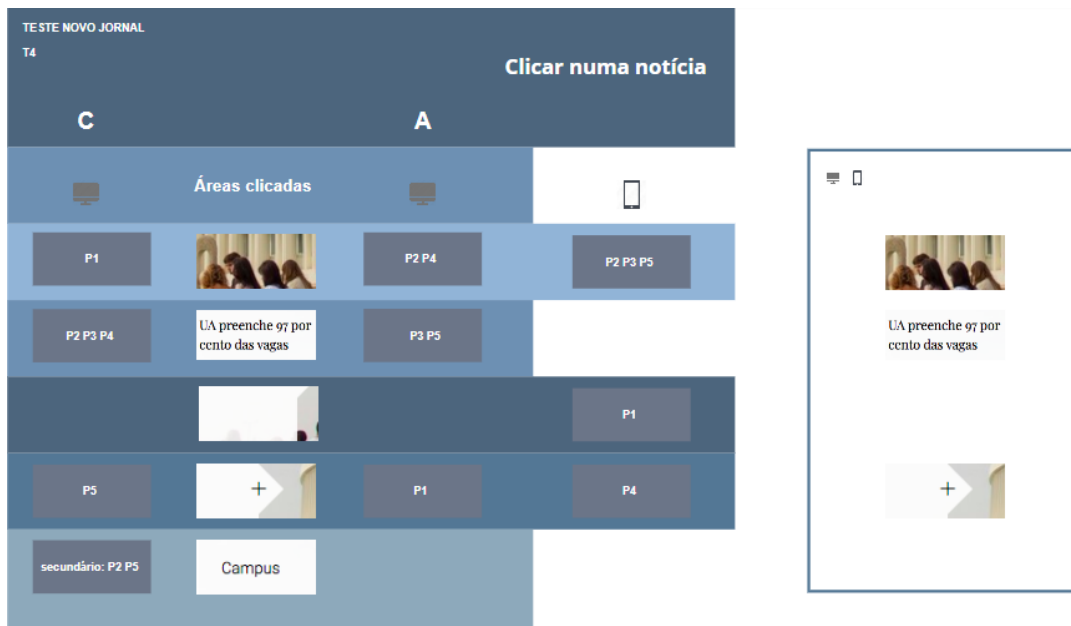


Figure 17 "First click test". The goal was to understand in which zones and interface elements people click to access a piece of news. The images were the elements that received the most clicks. Then, the title of the news and lastly the element +

Number of clicks

The number of clicks (2 inputs) is associated with the previous indicator and had the same purpose, to evaluate the interaction in a specific area of the interface (Figure 16).

Time spent

The time spent on a task (2 inputs) was another indicator present in the analysis model, but it did not have much use in obtaining inputs. The reason is that it was based on the Thinking Aloud Protocol, so it is not possible to use time as a metric since the participants of the tests talk and express themselves orally during the execution of some task (Haak & Jong, 2003). In these cases, the time considered is a

relevant indicator when the time for the user to complete a task was too long (over 60 seconds) or too different from the performance of other users (Figure 18).

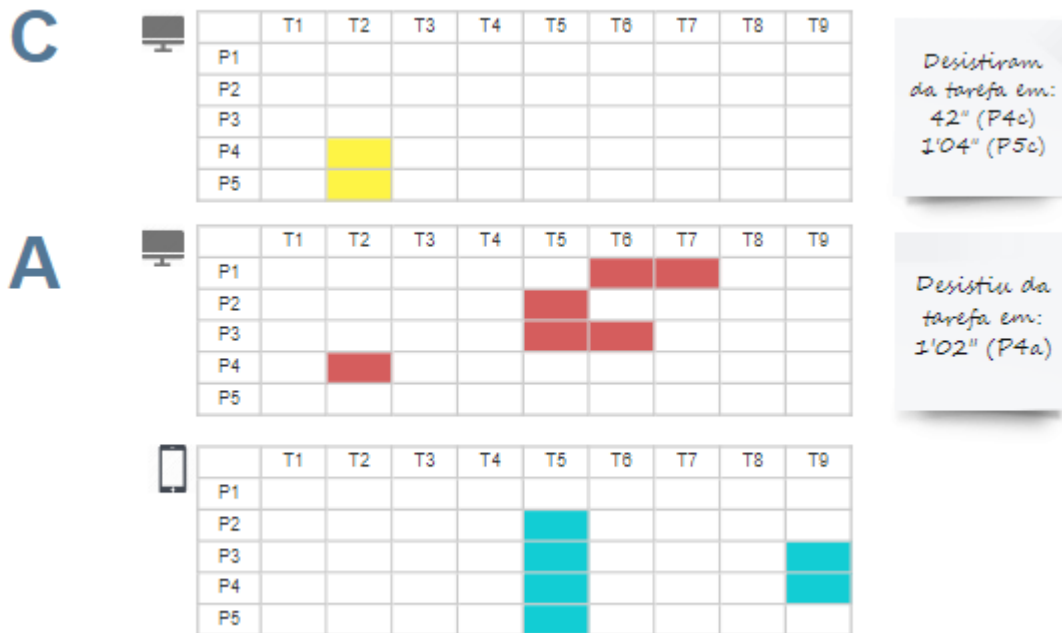


Figure 18 Part of the usability test report with students and university staff. The highlighted colors represent the tasks in which users spent between 42 seconds and 64 seconds to give up the task

Doubts

This indicator contributed to the collection of 1 input. It is created in the analysis model because it thought that people would have many doubts when interacting with an interface so different from what used them. But unlike this, even being a new digital environment, people were able to complete the vast majority of the tasks proposed in the usability tests. The only doubt expressed was when a user was not sure if an image had the link assignment. This doubt revealed the strong tendency that people must click on the image and expect this image to have link behavior, instead of clicking on a text.

The fact that the Doubt indicator was not as numerous. And, being much smaller in quantity, can prove that even the new news area is an entirely new digital environment (with many initial fears), the design of the new portal did not leave the user unsure when browsing the new News area.

4.2.1.2 Stakeholders Meetings

All indicators designed to collect information from the Stakeholders Meetings (Table 11) are considered valid, Compliments, Suggestions, Needs, and Complaints.

Valid indicators:

Compliments

In meetings with Stakeholders, the data collection used all the indicators provided in the analysis model (Table 1). Compliments were the most prevalent, with 14 inputs. It may mean expectations met by clients interested in the product and by orderly stakeholders. In Agile development, meetings with stakeholders, such as sprints reviews, represent an essential step in the iteration cycle where customer feedback ensures the development team's decisions. In these cases, compliments can mean the assumption that the team has achieved the expectation, need, and satisfaction of those involved. It also shows that the right decisions are scalable to other development stages, increasing the "hits" of the portal development team.

Suggestions

The nine suggestions presented are inputs that reveal the need for stakeholders to interfere with the design or functionality proposed by the development team or dissatisfaction with what was offered by the team. Sometimes it may be a need that the team could not meet when developing or designing, so the suggestions were presented as a way to adjust some elements of the interface that did not meet the wishes or needs of customers. They can also represent some help from the stakeholders to help the development team find a solution more suitable to the needs or expectations of the stakeholders.

Needs

The six inputs from this indicator denote situations in which stakeholders have

made some suggestion or manifested dissatisfaction concerning the interface presented. These were moments when they showed that the suggested changes or adjustments are vital for the digital product's functioning.

However, the stakeholder meetings were occasions when some needs pointed out for the excellent functioning of the news area did not depend on the portal development team, but on political-institutional decisions. (example: “We need a good picture”, said an institutional agent during the Stakeholders Meetings).

Complaints

Like the needs, the complaints did not always represent something related to the interface. In this case, of the three inputs collected, two of them showed problems that depend on institutional decisions, not from developing the new news area interface. A complaint manifested during the meeting revealed the need to improve the information architecture. However, this problem was to the general portal, but it reflected the interaction with the news area.

“We received many calls from people that ask us help to find information about hiring opportunities”.

“Recebemos muitas chamadas de pessoas que nos pedem ajuda para encontrar informação de concursos.” (in portuguese language)

For this reason, an institutional agent argued the need to include subjects like hiring in the news area.

Details available in The [Appendix 1.3](#) (Stakeholders Meetings Grid Analysis))

4.2.1.3 Extra input sources

Of the six indicators designed to collect information from the Extra Input Sources (Table 11), three are considered valid, Expert Review, Social Network Posts, and Comments on Teams App.

Valid indicators:

Expert Review

As explained in the analysis model (Table 1), the UXR source "Extra Inputs", represents all the feedback-gathering approaches that were not planned by the portal's Evaluation team. It is a diverse set of information sources that were occasionally relevant to provide strategic data for the development team. One of the indicators of this source is the Expert Reviews (Figure 19), responsible for leading the indicators' ranking, with 41 inputs. This data resulted from sporadic queries made to experts on unscheduled or last-minute occasions. There was no application of specific heuristics. The expert replicated the same tasks as in the user testing sections, but with expert perspective.

It is important to note that although these inputs were not anticipated, expert feedback contributed to no small amount of valid data. It shows that Expert Reviews can be a periodic source of evaluation and be embedded in the regular evaluation planning of a product.

URL	Tópico	Snapshot	Comentários CS
https://www.ua.pt/	[Trivial] Padding de cima não é igual ao de baixo. Deve ser uma mistura da altura dos separadores e do line-height do texto		Ok. Flávio pode ver. Feito
https://www.ua.pt/	[Trivial] A cor do botão está demasiado escura?		A estudar pela equipa de design
https://www.ua.pt/	[Minor] O layout com a imagem no canto fica um pouco estranho [Trivial] O feedback do hover ser apenas zoom na imagem não é inteiramente perceptível		A estudar pela equipa de design
https://www.ua.pt/	[Trivial] A área de hover do tooltip é demasiado restrita		Ok. Flávio pode ver. Feito
https://www.ua.pt/	[Trivial] O lado esquerdo do + não é clicável		Ok. Flávio pode ver. Feito
https://www.ua.pt/	[Trivial] Todo este texto não é seleccionável?		Ok. Flávio pode ver. Ta feito

Figure 19 Screen print of the expert report. Document available in [Appendix 2](#)

Social Network Posts

The "Social Network Posts" provided the contribution of 21 inputs. As explained in the analysis model, only the posts made by members of the development team on their social networks on the new news area of the UA Portal were observed. Stakeholder comments (academic community) on the postings made by the coordinator of the new portal project and by the Rector of the University of Aveiro at that time were observed. The 21 inputs represented feedback in the order of compliments to the portal, suggestions and other criticisms that will still be presented in this document, but that contributed to the gathering of feedback on that occasion when the new news area was launched. These comments on social networks were carefully analyzed, as there are comments that can be made just to please, there are comments where people were very spontaneous.

Compliment example: *“Another step towards the renewal of the UA portal, a work that is due to a large team of various services and departments, with students, teachers, and technical, administrative and management staff. Congratulations to all!”* (In portuguese language: *“Mais uma etapa para a renovação do portal da UA, um trabalho que se deve a uma grande equipa de vários serviços e departamentos, com estudantes, docentes e pessoal técnico, administrativo e de gestão. Parabéns a todos!”*)

Complaint example: *“It also seems to me that within the news, the body of the text could have the source a little larger.”* (In portuguese language: *A mim tb me parece que dentro da notícia, o corpo do texto poderia ter a fonte um pouco maior.*)

Comments on Teams app

There was only one evidence of this indicator, through a comment from a member of the team when transmitting a message from a stakeholder of the rectory. And it was to reinforce the same issue already discussed in a stakeholder meeting.

When created in the analysis model, this indicator was expected to be a source to collect many inputs, due to the great exchange of information among the team

members in this tool. But this did not occur in the sprints related to the development of the new news area, as it happened in other products developed for the portal. One of the weaknesses of this indicator is that it was possible to monitor only those areas of the tool where comments were publicly posted. Private conversations between team members were not accessed, either by the data protection policy or by the work environment's ethical posture.

4.2.1.4 Automatic Analysis Tools

Of the five indicators designed to collect information from the Hotjar Automatic Analysis Tool (Table 11), two are considered valid, Compliments, and Complaint.

Compliments

As already mentioned, Hotjar was the automatic analysis tool used throughout the UA portal's development period. The compliments related to the new news area came through messages sent by users through the feedback button (Figure 15). Later we will show the analysis of the data received via Hotjar, but it is valid to say that these compliments referred not only to the interface aspects of the new news area but also related to the news contents. These factors may reveal the satisfaction of using the interface or the satisfaction with the content or institution.

Complaint

Likewise, the complaints received via Hotjar are related to two factors: the product itself, as an interface, but may also be linked to dissatisfaction with the institution or the content of the news. It will be noticeable when we present the analysis of the results and problems related to the evaluated interface dimensions.

It is worth remembering that people may be more tempted to send complaints than compliments in these types of feedback sources. This gives the compliment received a much greater value. Nevertheless, on the other hand, the fact that the person is willing

to send negative feedback is a sign that they need the product or care about it. The fragile aspect of this type of indicator is the very nature of the automatic analysis tool. Being an asynchronous analysis method, it is not always possible to understand and interpret what the user meant in the message.

4.2.1 Unused Indicators

After discussing the valid indicators, i.e., those that were accounted for per occurrence (present in Table 11), we will now discuss the aspects related to the missing indicators, those that were foreseen in the analysis model of the research plan, but that for some reason were not used in the information collection process.

We consider this section important because the absence of an indicator or its non-use in the data collection instrumentation may be essential to reflect on the analysis model's possible weaknesses or even to observe the complexity inherent to each measurement process UXR source.

Of the four UXR sources analyzed, only in the "Stakeholder Meetings" source was it possible to register all the indicators foreseen in the investigation plan (compliments, suggestion, need, and complaint). These four indicators present in the stakeholder oral discourse had the same form of recording (in the third person), through field diaries.

However, in the UXR sources "User Testing," "Extra inputs," and Automatic Analysis Tools," not all indicators were used in the instrumentation of data collection. So, let us talk about them now.

4.2.2.1 User Testing

In the UXR source User Testing, five indicators provided in the analysis model did not use.

Tasks Accomplished

During the data gathering to analyze the usability test videos, the team gave more importance to the tasks not completed by the users. When focusing on negative indicators, such as Task Not Performed, the intention was to solve the problems that

prevented good navigation. However, Accomplished Tasks could have been accounted for to ratify bold decisions or paths.

Score

The System Usability Scale (SUS) (Tullis et al., 2008) and the Sequence Question (SEQ) (Tullis et al., 2008) were the two scales applied in the tests to measure the usability of the tested interfaces. Nevertheless, these scales only reaffirmed a perception of the evaluated product that the team already had. Therefore, more than the Scores (SUS and SEQ) result, the team cared about the richness of expressions and behavioral data revealed in the tests. It is clear that the score of a usability scale is essential, but even having a satisfactory score, the tested product may present flaws and defects that are only found through an analysis of the users' qualitative inputs.

Thus, the Scores did omit from the instrumentalization. Therefore, they were not used as a means of input collection.

Interruptions during the test

This indicator was used as an input. By following the Thinking Aloud protocol in the usability tests, the interruptions that could arise on the part of the evaluator were manifested in the form of doubts, suggestions, complaints, and other forms related to valid indicators. If the interruptions on the part of the evaluators have been taken into account, we would have duplicated the data.

Time of navigation

This indicator was created to measure the performance of the blind users in usability and accessibility tests since the use of the keyboard is part of the operationalization of assistive technologies. Since the blind evaluators did not have any difficulty related to the navigation time to complete any task, these values were omitted.

The sequence of navigation using "Tab" on task

Similarly, the sequencing of navigation using the keyboard was a predicted indicator to verify possible accessibility inputs during usability tests with blind people. However, no input revealed any difficulty of the evaluators in the navigation sequence. These last two indicators, "Time" and "Sequence," could be considered if the observation's focus

was also the absence of the problem. As we have already mentioned, the inexistence of difficulty may also show a need to be met.

4.2.2.2 Extra input sources

In the source "Extra Input Sources," three indicators had values omitted because they were not collected:

Team member comments

A multidisciplinary team in an Agile environment is typical of the exchange of ideas and insights between members (MCKenna, 2016). With the analysis model's design, it would be hoped to catalog the team members' contents. However, the comments regarding the digital product evaluated in this research had much more the characteristic of doubts and fears. Thus, the team members' comments were more directed to the design of the usability test tasks.

Email messages

It was expected that the portal team would receive emails with feedback related to the new news area, but this did not happen because it was not stimulated or motivated as a data gathering strategy. Instead, the resources that channeled the reception of feedback messages were Hotjar, an indicator classified as Automatic Analysis Tools. Even those who were from the institution used Hotjar as a feedback tool, and not the email.

Informal approach

Considering that people approach us and make comments and suggestions informally, perhaps even spontaneously, this indicator was created so that this type of input would not be lost. However, this approach did not happen. Indeed, the vacation period and the return to class created a scenario characterized by the omission of these occurrences.

4.2.2.2 Automatic Analysis Tools

- a) In the data source "Automatic Analysis Tools," three indicators were omitted.
Heatmap recorded on Hotjar

Although this tool is an essential source of analysis and insights, the Hotjar's heatmap recording tool was not used for the new news area, as the architecture designed for the leading portal has been replicated for the news area. If the News area structure was

different from the remaining areas of the Portal, the heatmap would have been a useful source of information.

b) Suggestions received from Hotjar

Being a tool for receiving messages and feedback about the navigation experience in all areas of the UA portal, including the new news area, it was expected that suggestions from users would arrive. However, no such occurrence was observed.

c) Doubts received from Hotjar

Similar to the previous indicator, no doubts related to the news area were registered in Hotjar. The doubts received touched other areas of the portal related to the university services.

4.2.3 Recapping about the inputs

In this part of the discussion of results, we have explained that the 371 inputs collected by the four UXR sources represent the valid cases collected by the different indicators. We also discussed that each UXR source's indicators have different natures and measurement capabilities, which may have influenced the "weight" of each source in the data collected.

We also explained the indicators representing the valid data and critically justified some aspects of the analysis model that revealed some fragility regarding the indicators that were not used in the process of instrumentalization and collection of the observed data.

4.3 UXR sources' contributions to Product Solution generation, Requirements support, and identification of Input Typologies according to the interface dimensions.

In the hypothesis tests described in the previous section, we observed that each UXR source allowed the collection of a specific number of inputs to evaluate the new News area of the UA portal. Each of these data collection sources allowed to support requirements, identify problem typologies and define solutions.

In the context of the University of Aveiro, where cultural multiplicity is translated into users with different interests and needs, it is crucial to understand which UXR source can present the best approach to identify a particular type of problem or to know which one has the most outstanding efficiency to support some requirement. These decisions may interfere with the type of solution ultimately presented to end users' needs.

Thus, in the next section, we will show how the four UXR data sources (as dependent variables) related to the independent variables: Typology of problem, Requirements, and Product Solutions. The next section [4.3.1](#) presents an initial analysis of the frequency of the four distributed "Sprint" time-variable sources.

4.3.1 Observing the frequency of UXR sources by Sprint

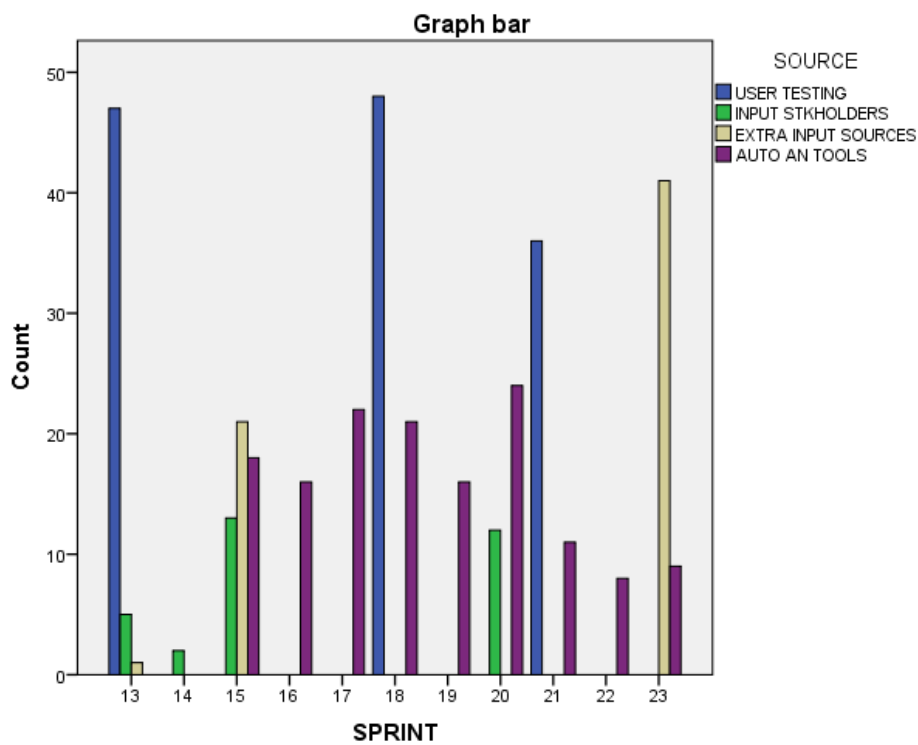
By observing the frequency distribution table of the UXR sources/inputs (Table 10 and 11), it is possible to notice the two sources with the highest number of data collected: "Automatic analysis tools" and "User testing." In terms of numbers of inputs, the "Automatic Analysis Tools" (Hotjar software) shows more data volume collected than "user testing". However, comparing the frequency of distribution of each of these collection sources over the 11 sprints and the potential of each of them for the output improvements was different, and in the point of view of product solution delivery the Automatic Analysis Tools offered an almost insignificant contribution.

It is interesting to compare the frequency of the data collected from these two sources observing its importance for the output improvements: according to the Crosstable (Table 10) and the bar graph below (Graph 6), the source "Automatic Analysis Tools" (Hotjar) was present in 9 of the 11 sprints and generated 145 inputs. Whereas, the "User Testing" data collection source, even frequent in only three sprints, was enough to collect 131 inputs.

It is essential to remark that the frequency of use of each UXR source is bound to its need, nature, and team routine. A tool like Hotjar, for example, was used almost daily. Moreover, it is a tool that is always available to those who access the UA portal at any time, at the user's initiative, different from other collecting information methods. The Usability Tests (as a kind of User Testing approach) had a more spaced-out cycle of iteration (and intentionally planned), as well as the collection of inputs in stakeholder

meetings (mainly during the decision-making) and Extra Inputs Sources (when the data had been collected in unpredictable situations).

Of course, each one of the four UXR sources had some specific relevance in the digital product evaluation process with end-users. A low amount of data gathering does not always mean that the source has low importance. Sometimes, even the methodology that allows a limited collecting of feedback can be fundamental for improving the interface. In the following sections, the specification of outputs will be more detailed.



Graph 6 Distribution of inputs generated by type of UXR source

Still analyzing Table 10, another factor deserves to be highlighted: each UXR method, as a source of data collection, has different ways of being measured. That is, the indicators are not always the same. That is the very nature of the user's source of information collection influences the volume of input acquired. The valid indicators have been described in section 4.2.1 and can be reviewed in Table 10.

- 145 inputs from the Automatic Analysis Tools source have been obtained through 3 valid indicators.
- 131 inputs from the User testing source have been obtained through 8 types of valid indicators.
- 63 Extra source inputs had been obtained through 3 valid indicators
- 32 inputs from the Stakeholders Meeting source have been obtained through 4 types of valid indicators.

Considering their respective volumes of inputs, we will show below how each of these sources contributed to support the Requirements, identifying interface dimensions problems, and the Product Solution generation.

The great value of the UXR data sources is not in the number of inputs generated but in the effectiveness of these inputs concerning the independent variables. For example, as will be explained below, the "Automatic Analysis Tools" font, despite having presented the most considerable amount of inputs collected, was an insignificant UXR source for generating Product Solution (outputs). Moreover, Product Solution is the leading way to meet users' needs. On the other hand, it can be an interesting tool to obtain at very fast speed feedback from the user when bugs occur or when the institution wants to obtain feedback related to social presence.

4.3.2 The contribution of UXR sources to Product Solutions

Not all the valid Inputs explained above required an effort from the portal team to provide solutions to the identified needs. Therefore, this section will show the relationship between the valid inputs from the UXR sources and Product Solutions. It is important to remember that the numbers do not correspond to the amount of solution developed, but rather to the number of inputs that effectively contributed to delivering solutions.

If the focus of this dissertation is to discover the nature of the data sources (inputs obtained in the UXR) most contributed to the product solutions developed (outputs), based on our results (Table 13) it is possible to reaffirm that: the "User testing" was the

UXR source that most contributed to the development of solutions for the new area of News.

Table 13 Cross-tabulation between Sources and type of Solutions

		SOLUTION (output/delivers)			Total
		Adjustments	Corrections	New features	
SOURCE	USER TESTING	62	12	4	78
	INPUT STAKEHOLDERS	12	0	0	12
	EXTRA INPUT SOURCES	14	5	0	19
	AUTOMATIC ANALISYS TOOLS	0	15	0	15
Total		88	32	4	124

In the next sections, the relationship between each source is analyzed:

Automatic Analysis Tools

While the "Automatic Analysis Tools" source led in the number of inputs collected (145), the effectiveness of these inputs for generating solutions dropped to 15 inputs. Of all that large volume of collected feedback, only 15 were used to produce solutions for the News area. It was the source that least contributed to the feedback received.

This finding leads to the belief that, if the project focused only on solving problems, Hotjar would not be an efficient automatic analysis tool for this purpose. Its asynchronous dimension can weaken the interpretation or perception of what users want to express in the messages sent. On the other hand, the fact that it is always accessible with a feedback button on the interface makes the University available 24 hours a day to receive feedback. Of course, if we analyzed other features of the new UA portal, the result could have been different. Nevertheless, if it is the new News area as an object of study, the numbers show the opposite.

Further on, when we talk about the other variables, we will see that this UXR source, although not so useful from problem-solving, can be a suitable means from social presence and public service (Figure 20).

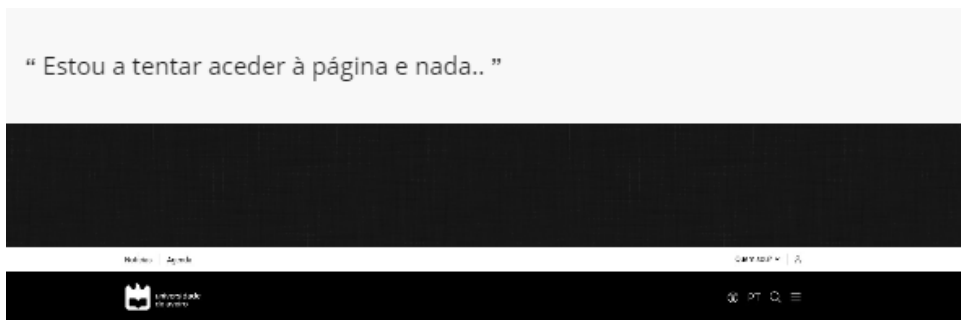


Figure 20 "I'm trying to access the page and nothing." User feedback via Hotjar about bug that prevented viewing the news page

The type of solution this UXR source helped generate were 'corrections', as an example in Figure 21 (bug fixes identified in users' responses sent via Hotjar).

	A	B
1	Área/página	Descrição
2	pesquisa notícias	design: avaliar lista de resultados com imagem das notícias
3	página 404	Rever design
4	página 404	Implementar alterações
5	página 404	Como volto atrás quando tive um erro? Com um redirect em todas as
6	página 404	A página que existe é importante mas para situações críticas de
7	página 404	Situações de erro como um id de um curso que não existe deve ter
8	Geral	Utilização de camada de Flux

Figure 21 Example of an excel spreadsheet to report bugs and the development team to solve

User Testing

Leading the Product Solution variable with 78 valid inputs for the output process, User testing approaches proved to be the UXR source that most allowed the development of solutions as a response to users' needs (Figure 22).

The usability tests, in-depth interviews, and other methods on the "umbrella" of User Testing, had a synchronous approach. During these moments, the UX professionals had a decisive role as a moderator or as an observer of users' behavior during evaluation. The human ability to observe and listen to others makes the empathy process a differential and advantageous quality compared to the asynchronous UX assessment tools (Jeff & Chisnell, 2008).

The results of User Testing methods depend not only on the ability of the professional mediator but also on the proper execution of the task definition protocol, the recruitment of people, the choice of the testing environment or room, the product to be tested, and the intention of the team behind the whole organization (Dumas & Loring, 2008; Preece et al., 2015).

In the context of the University of Aveiro, User Testing approaches revealed to be beneficial and highlighted advantages that are worth highlighting here, even if they are not part of the analysis model or are not the focus of this research. The involvement of people in the co-design process of an institutional digital product that is part of these users' lives can be strategic from the user's satisfaction with the product itself and the institution. In stakeholder meetings, participants appeared to be resistant to the portal's new format were recruited for the User Testing sessions. In addition to making their contributions, these people felt good about being heard. Step by step, they changed their stance and became advocates for the new portal or felt responsible for being an integral part of this challenge to build a new portal.

Of the 78 inputs that allowed the generation of solutions, 62 were answered in the form of adjustments to some element of the interface, 12 in the form of correction of some error in the interface, and 4 in the form of delivery of new features. The fact that we had more adjustments than solutions may be an evidence that the interface design was close to users' expectations, demonstrating the development team's maturation process in knowing its clients' preferences and replicating the learnings in a scalable way to other areas of the new portal.



Figure 22 In this example reported in a usability test, users complained about the long scroll to get to the agenda news

These comments highlighted the urgent need to create a “back to the top” button (arrow, Figure 23) considering the long scrolling page.



Figure 23 The "Back to top" button is present in the news area and on all pages of the portal

In the section on error typology ([4.3.4](#)), some illustrations of examples show the solutions provided by the UXR User Testing source.

Input Stakeholders Meetings

Similar to the above described, the inputs received from the UXR Stakeholders Meetings contributed a lot to adjust the new news area. Twelve (12) inputs were collected that allowed adjustments to the interface. These meetings were mainly held during Sprints Reviews, where the results of tests and new prototypes were presented to Stakeholders.

These meetings also enabled stakeholders to realize the importance of supporting the requirements, and of better understanding how the target customers reacted to the prototypes and interfaces being developed.

On the day that the first version of the Portal was presented to stakeholders, the university communication services asked the team to give more prominence to title (also called heading one or H1) "News", Figure 24.

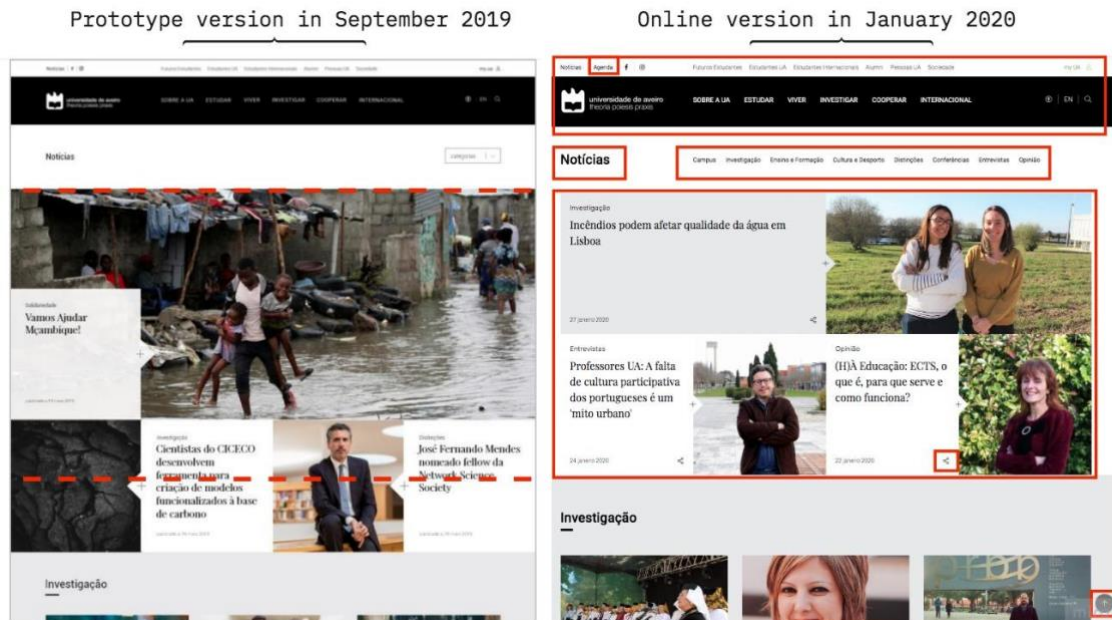


Figure 24 Comparison of the main page of the News area. Reducing the size of the news photos was one of the stakeholder meeting subjects during Sprint 13

A suggestion was also received concerning the decrease of the photos so more news could fit in the highlights area. In the first version, the news categories were hidden in a drop-down menu list, and there was no redundant link from the news area in the audience menu.

It is also worth mentioning the adjustments made to allow the integration of the institutional video in the portal's highlights' information area. This challenge called for the integration of new requirements, both regarding technical and accessibility issues, as the area of institutional highlights was not designed to support videos. Furthermore, the other big problem was that if the portal allowed the insertion of video without meeting the minimum requirements of accessibility, the portal would lose the AAA accessibility level of W3C (W3C, 2019), preventing, among other limitations, blind people the right to access information with quality and equity.

Aware of these impediments, stakeholders became aware and accepted the challenge of remaking the institutional video to make the content accessible to all both in Portuguese and English. While the university's communication service made the new

versions of the video, the UA portal development team adjusted the institutional highlights module to be compatible to receive accessible videos. Details on the results obtained in the area of accessibility are available in the attachments area ([Appendix 3](#) and [4](#)), where in addition to the testimonies of the blind about the accessible video, it is also possible to read a document on the portal's accessibility and usability actions in general, submitted to the AMA Accessibility and Usability Seal (AMA, 2020). The section on UXR sources' relationship with the Development Requirements (Table 13) also presents some details on this issue.

These results show that Stakeholders Meetings are an appropriate way to share feedback from end-users with the development team. Watching videos or reading sentences with the testimonies of end-users has contributed to raise awareness of those involved and to motivate the development team that often falls into a routine of processes that may become automatic. The transcription with the feedback of the blind is at the [Appendix 1.3](#) (Stakeholders Meetings) and [Appendix 4](#) (Video Transcriptions of blinder feedback regarding accessible video), and some excerpts are in section [4.3.4.2](#).

Behind hours of work and thousands of lines of programming codes or wireframes, there are people who will be thrilled or delighted to use the digital product. his accessible video enabled blind users to see the content that they would not have access to in another situation. As an observant researcher, we emphasize that we saw teammates and stakeholders thrilled with the blind people feedback. This was a very important step that positively impacted the motivation both of the development team and of the institution itself.

Extra input Sources

As already explained in the section where valid indicators are described ([4.2.1](#)), the UXR Extra Input source is characterized as a mixed category, in which last-minute or unplanned data collection approaches were grouped together. The comments in the collected social network posts (Figure 25), the expert review reports, or the Teams app's feedback served to reaffirm a need that the development team already knew, contributing to create new solution processes.

Fourteen inputs from this category contributed to the interface adjustments, and five inputs helped to correct problems in the new News area.

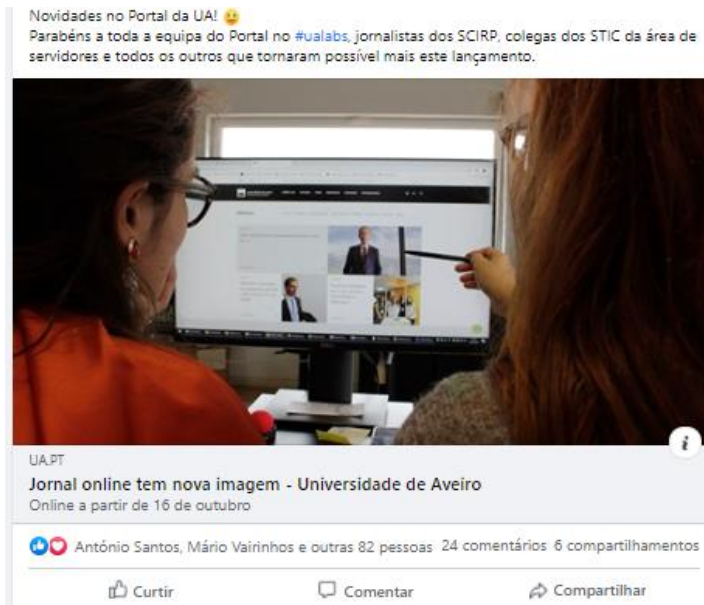
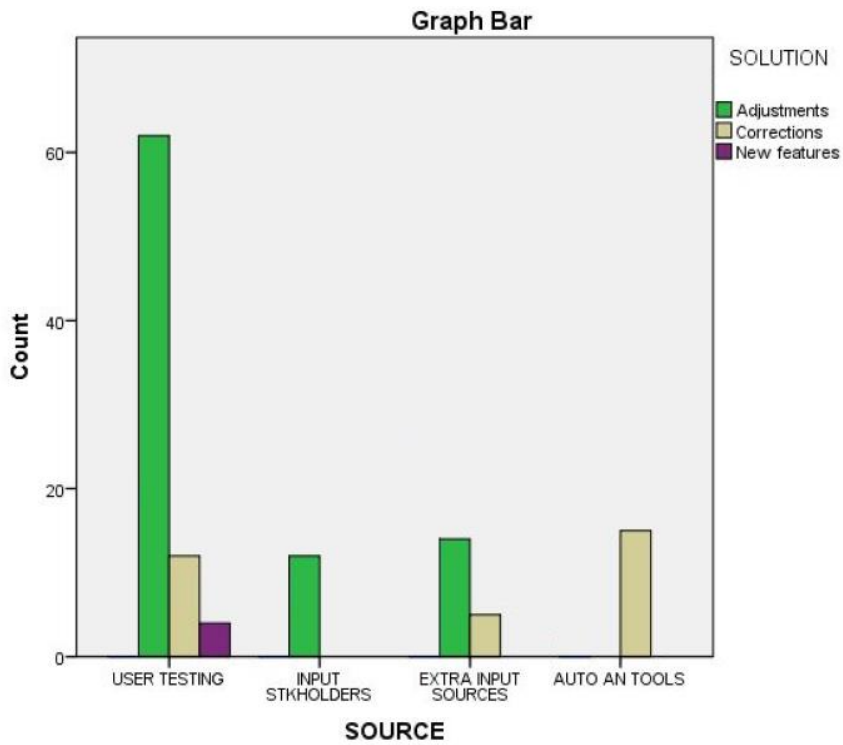


Figure 25 The project's general coordinator made this post about the launch of the new UA news area. The content of the 24 comments is available in the analysis grid, in the appendix (1.4), and all the inputs collected in this UXR source

Because it is composed of a diverse set of sources, it became complex to make some judgment about the performance of this UXR source to help solve problems. The social network data is mainly composed of spontaneous comments sent to the cycle of friends who posted. Despite this limitation, this data was useful to reinforce some information that had already been collected by the team. Even if carried out without planning, the expert reviews presented a specific level of quality and depth. Nevertheless, both sources contributed to the data collection process.

4.3.2.1 UXR and Product Solutions Source Relationship

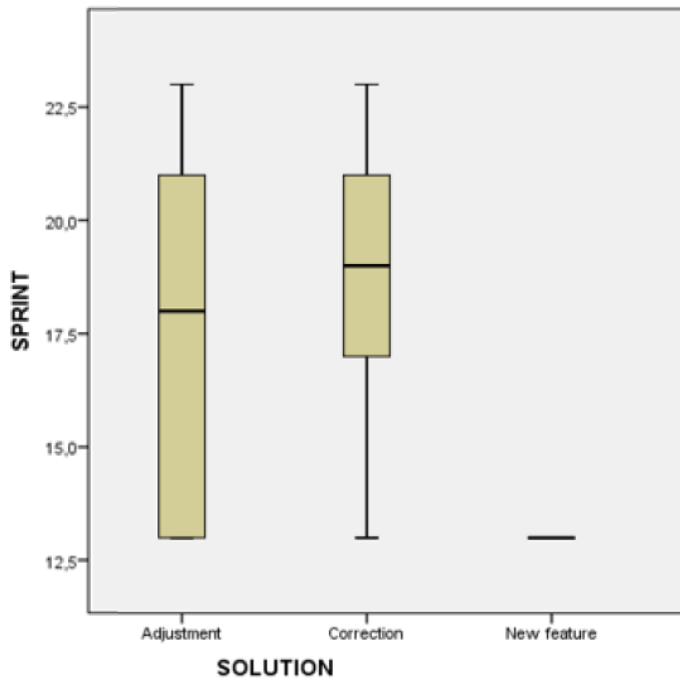
The following statistical graph representations (Graph 7) help to understand the frequency distribution of the evaluated data distribution of input frequency.



Graph 7 Frequency of solution types by UXR source category

The bar chart (Graph 7) illustrates the contribution of each UXR source to product solution insights.

The following chart (Graph 8) represents the data formed from boxplot, listing the types of product solutions from all UXR sources by Sprint.



Graph 8 Distribution of output/solution types over the 11 development sprints

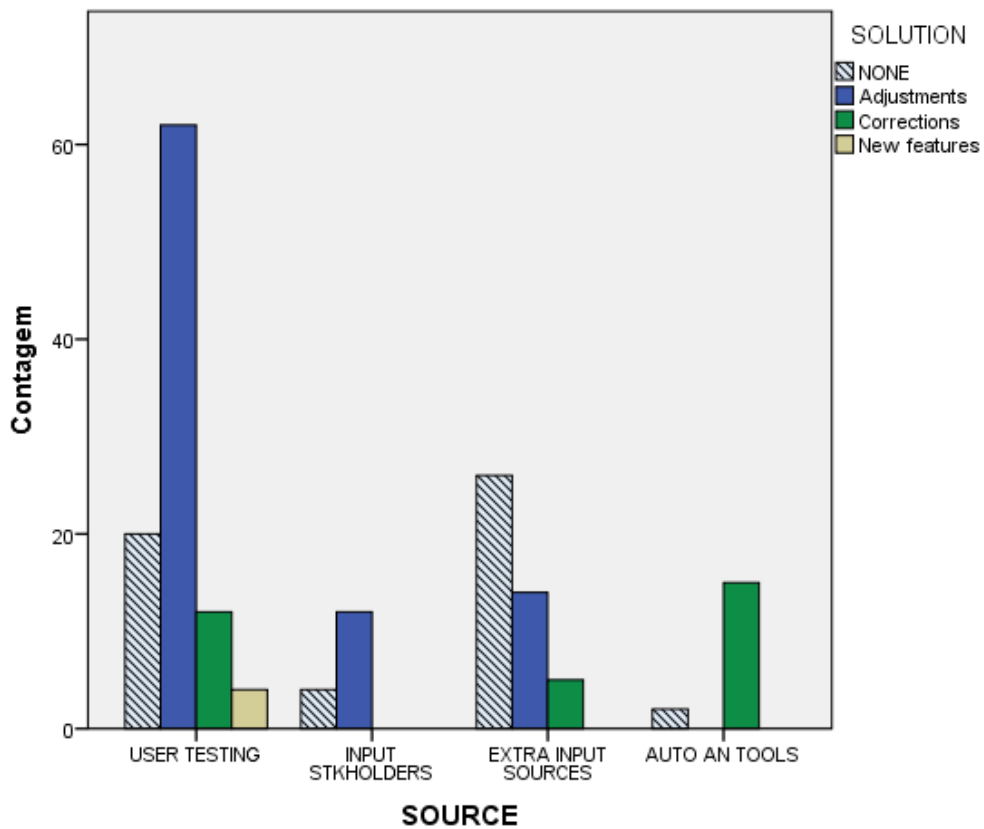
The output New Feature was the only one that presented only the minimum value in the "Sprint" time scale (Graph 8). From sprint 13 on, the development team was more dedicated to adjusting in almost the new news area's entire evaluation period. In the middle of the roadmap, from Sprint 16 on, the dedication was to make corrections, as indicated in Table 8 regarding all the solution data.

In the analysis model, we explain the meaning of each of the Product Solution indicators. In the data shown so far, we have not considered the indicator "NONE." Under this scope, it's worth remembering that this indicator (NONE) represents all the inputs received that, for some reason, were not considered, ignored, or were not prioritized at that moment of the sprint.

Table 14 The table shows the Frequency distribution of the types of solutions, considering the valid cases, and excluding the missing values

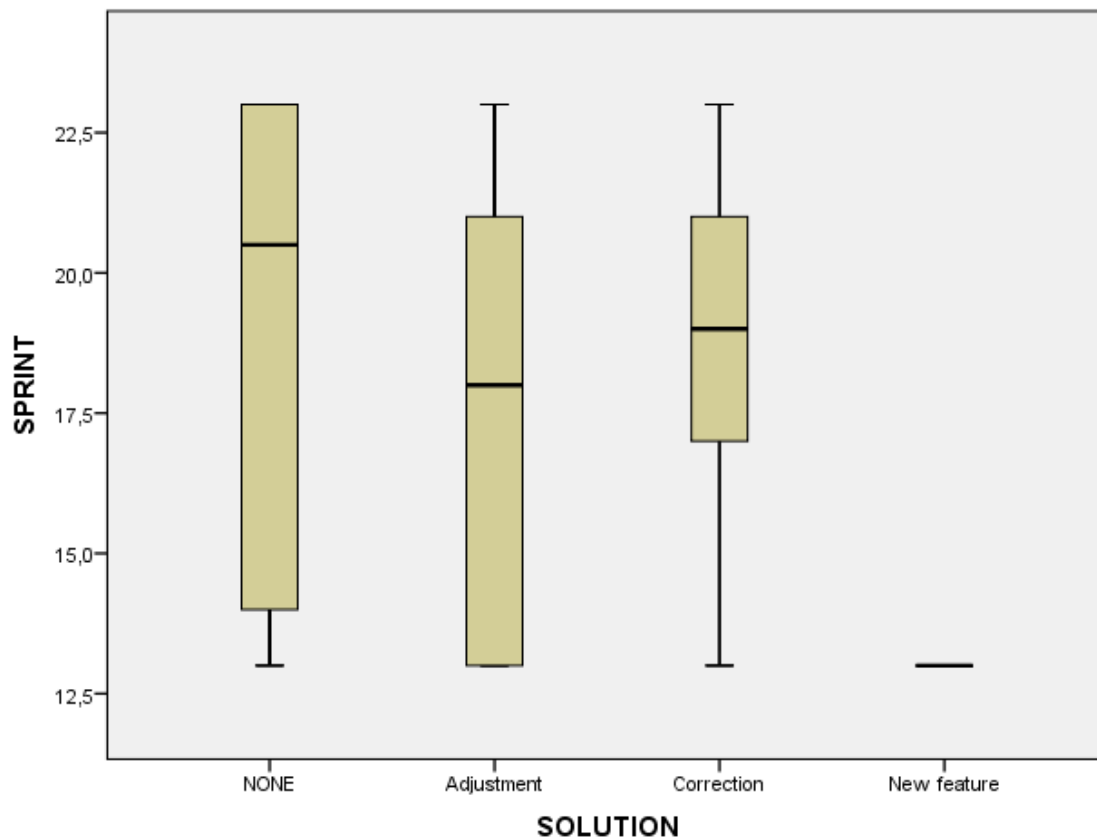
		SOLUTION			
		Frequency	Percentage	Valid percentage	Cumulative percentage
Valid	NONE	24	6,5	19,5	19,5
	Adjustments made	68	18,3	55,3	74,8
	Corrections performed	27	7,3	22,0	96,7
	New features developed	4	1,1	3,3	100,0
	Total	123	33,2	100,0	
Omitted	999	248	66,8		
Total		371	100,0		

If the variable "NONE" was not taken into account (Graph 9), it is possible to notice a considerable part of the inputs received (Graph 10) had not been placed in the team's output development flow.



Graph 9 The graph shows the distribution of the types of solution demanded per UXR source

Despite being an indicator of inputs that did not contribute to delivering solutions, we decided to show this data to reinforce that these inputs represented feedback received. However, the team could not meet them, either in the form of adjustment, correction, or new functionality.



Graph 10 Boxplot chart considering the cases classified as NONE

Thus, it is possible to suppose that if the team had more time, resources, or political openness, the inputs classified as NONE could have been addressed.

4.3.2.2 Recapping: UXR sources x Product Solution

In this part of the study, we showed how each UXR source contributed to the Product Solution process, that is, the outputs.

Most of the inputs (88) allowed solutions in the form of adjustments to the news area interface: corrections, with 32 inputs and New Features, with five inputs.

It was found that the UXR source that most helped to collect valid inputs for the development of solutions was the User Testing, followed by Stakeholders Meetings, Extra and Automatic Analysis Tools.

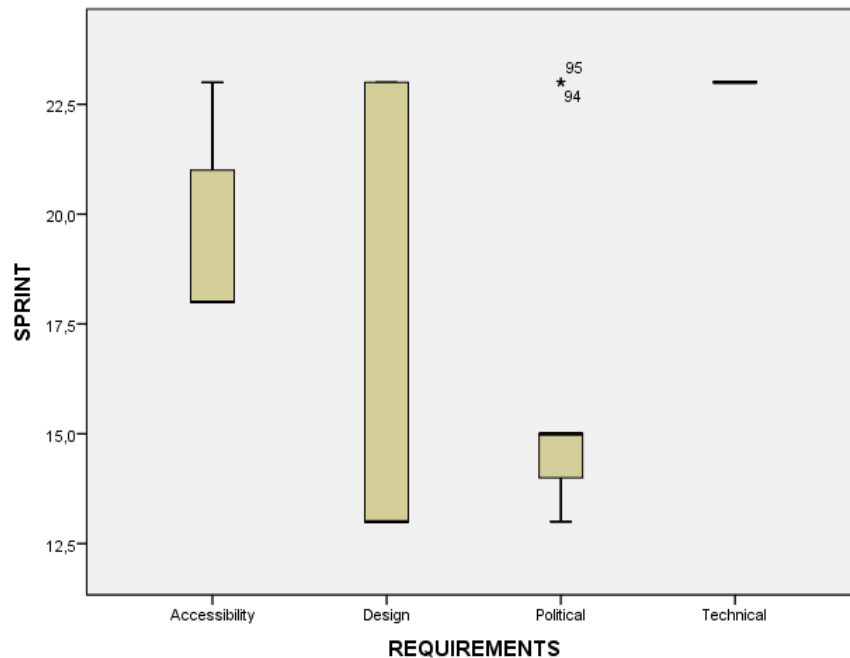
We showed examples representing each of the sources and saw that the inputs' relevance is not linked to the number of inputs collected, but to what the collected feedback can provide to digital product development. One example that ratified this statement was what we showed regarding a solution created from an input generated in a Stakeholder Meeting. Even though a UXR category did not lead the collection ranking, a single input provoked a deep mobilization of the team to adjust the portal's highlight area to receive accessible videos. This case also reinforced the importance of meeting development requirements as an opportunity to raise awareness of the team, stakeholders, and to empathize with users with disabilities.

We also saw that 19.5% of valid cases represented inputs that, despite having been received and accepted by the team, were not addressed in time.

4.3.3 The contribution of UXR sources in supporting Requirements

The purpose of this section is to show what development requirements UXR fonts have helped to support different dimensions: Accessibility, Design, Political, and Technical.

As explained in the analysis model (Table 1), the requirements did support when some indicator originated by the inputs causes constraints or compromises accessibility, design, policy, or technical aspects. However, not all feedback collected is related with requirements that have no longer been fulfilled. Therefore, of the 371 global inputs (Graph 11), 194 were considered valid, i.e., they reveal some requisites were not addressed.



Graph 11 Boxplot displays the distribution of the requirements supported over the 11 sprints

By analyzing the boxplot (Graph 11), it is noticeable that most of the user-needs collected by the UXR sources supported the Design requirement during most of all the sprints evaluated.

Design

One of the reasons why the Design requirements have been the most achieved ones is related to the fact that new UA portal represents a big change in the Design approach, when compared with the Portal former version. All the released design system elements and components resulted in a completely different template from the previous version. The visual design felt the effects of people's hunches, opinions, and suggestions. In the new UA portal, the new interface represented a paradigm break, both in the aesthetic sense of interaction and in the information architecture. Usability tests were, therefore, mostly moments when users approved the new look which was considered a breakthrough. Nevertheless, it was also common to hear remarks that denote resistance to the novelty as the old interaction model has been used for years. Suddenly these people came across an interface representing a different visual identity and felt uncomfortable *“You could highlight the title “News” by giving it a color (Grenada).”*

(Suggestion of institutional agent to highlight title News, during Stakeholders Meetings, in Sprint 13).

Assigning the Grenada color to the title News (Heading 2) of the page would not be the right solution, as it would generate constraints with the Design requirements (Figure 26).



Notícias

Title News before UXR approaches:
Colour: Black
Font-size: 20 px



Notícias

Title News if the suggestion from Stakeholders Meetings was accepted
Colour: Grená
Font-size: 20 px



Notícias

Title News as solution suggested from User Testing sessions and defined by the UA Portal team
Colour: Black
Font-size: 28 px

Figure 26 At the top of the image, the title of the page as it was. In the center, as it would be if the suggestion was accepted. Below, the title News, as it is currently

The tests showed that people could not find the Heading 2 to return to the main page. The best solution was to increase the font size from 16 pixels to 28 pixels.

Accessibility

Accessibility requirements were the second ones that UXR sources most helped to support. As can be seen from the Boxplot (Graph 11), inputs were concentrated halfway through the end of the roadmap, in a time aligned with the tests that were conducted with blind and accessibility experts (Figure 27).



Figure 27 The user testing session focused on accessibility with experts in the field

Accessibility tests were centered more than halfway towards the end of the roadmap does not mean that the portal team was not focused on these issues—quite the contrary. Validations and accessibility checks were part of a daily routine of the digital product QA process. However, these initiatives had not foreseen in the analysis model. If the manual and automatic accessibility checks had been included in the indicators; indeed, the accessibility requirements would have been equally or more supported than the design requirement.

The maintenance of the W3C⁷ label in the portal's main areas, including the news area, and the application of the portal for the Gold Seal of Accessibility⁸, highlights the team's efforts to develop an increasingly inclusive product. The [Appendix 3](#) presents the reports with the summaries of the tests that helped identify the accessibility issues that the portal team solved.

Political

Third, the inputs showed conflicts from a policy point of view (naturally in the initial sprints, where many institutional decisions had been needed around the portal news area). At the end of the roadmap, discrepant values indicate the institutional decision-making processes when the product had been delivered.

Some responses to the problems or needs identified in UX surveys depended on some institutional agents' political decisions. For this reason, the constraints of political requirements happened. One example that illustrates this situation refers to the usability tests' suggestions on sharing buttons in social networks (Figure 28).

⁷ The W3C Triple-A Accessibility Seal (AAA) has been assigned to the UA portal's main page. The others are mostly double-A (AA).

⁸ The report on the UA portal's application process for the Gold Seal of Accessibility and Usability, promoted by the Portuguese Agency for the Modernization of Public Administration, can be found in the annexes section (Appendix 3).

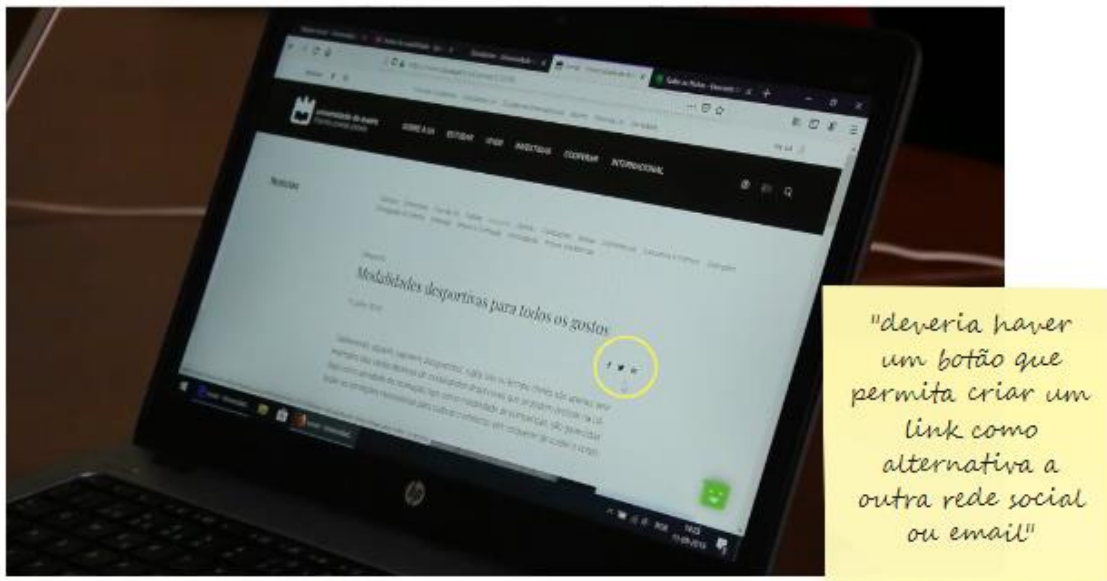


Figure 28 In this example, the user demonstrates the need to have access to sharing on other social networks

Users hoped to find a way to share the news to many social networks, not just those made available (Twitter, Facebook, and LinkedIn).

"I would like to share via email, or on Reddit, but it's not possible. I don't like to use these social networks you put here."

"Gostaria de partilhar via e-mail, ou na Reddit, mas não é possível. Não gosto de usar estas redes sociais que colocaram aqui." (in portuguese language)

said one of the students who participated in the usability test.

The solution found by the portal team was to offer a link sharing icon, the chain button (Figure 29).

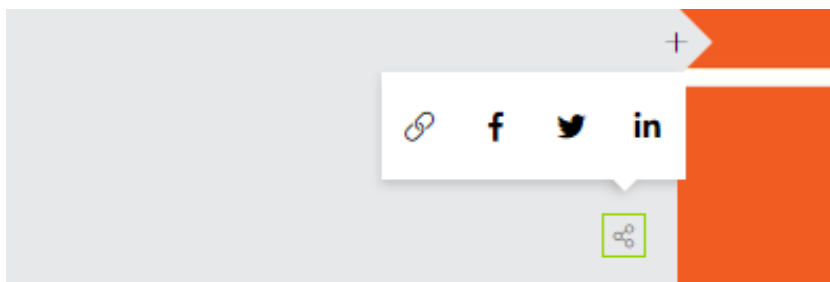


Figure 29 The sharing button added to attend the users

Similar needs arose from other users, and the decision taken to the institutional agent. As the new portal's ordering client, the political-institutional decision was to refuse suggestions that asked to add other social networks or sharing options. Thus, at that moment, the portal team classified the solution as NONE, i.e., "do nothing," leave it as it is. In other stakeholder meetings, an alternative solution was presented by the design team. The output was to insert the link-sharing icon; this way, the user could share the link with the personal browser options or paste the link URL.

Technical

The technical requirements were the ones that were least affected in the development field, from the end-users. Maybe this is evidence that the choice of technical solutions to be used in the digital interface development was not an obstacle to the interface. An additional factor is that by giving feedback, the end-user was not looking at the technology behind the system but at the interface's dimensions. It means that none of the needs identified for the news area has encountered any obstacle linked to the development technologies used in the portal.

4.3.3.1 Relationship between UXR sources and Requirements

The following frequency distribution Table 15 details each UXR source's contribution to the number of inputs that helped to support the development requirements. The inputs that did not cause any constraints to the portal requirements are not described.

Table 15 Frequency distribution of requirements per UXR source

SOURCE			Frequency	Percentage	Valid percentage	Cumulative percentage
USER TESTING	Valid	ACCESSIBILITY	84	64,1	64,1	64,1
		DESIGN	46	35,1	35,1	99,2
		POLITICAL	1	,8	,8	100,0
		Total	131	100,0	100,0	
INPUT STKHOLDERS	Valid	DESIGN	5	15,6	31,3	31,3
		POLITICAL	11	34,4	68,8	100,0
		Total	16	50,0	100,0	
	Omitted	999	16	50,0		
	Total		32	100,0		
EXTRA INPUT SOURCES	Valid	ACCESSIBILITY	1	1,6	2,2	2,2
		DESIGN	39	61,9	84,8	87,0
		POLITICAL	3	4,8	6,5	93,5
		TECHNICAL	3	4,8	6,5	100,0
		Total	46	73,0	100,0	
	Omitted	999	17	27,0		
Total		63	100,0			
AUTO AN TOOLS	Valid	DESIGN	1	,7	100,0	100,0
	Omitted	999	144	99,3		
	Total		145	100,0		

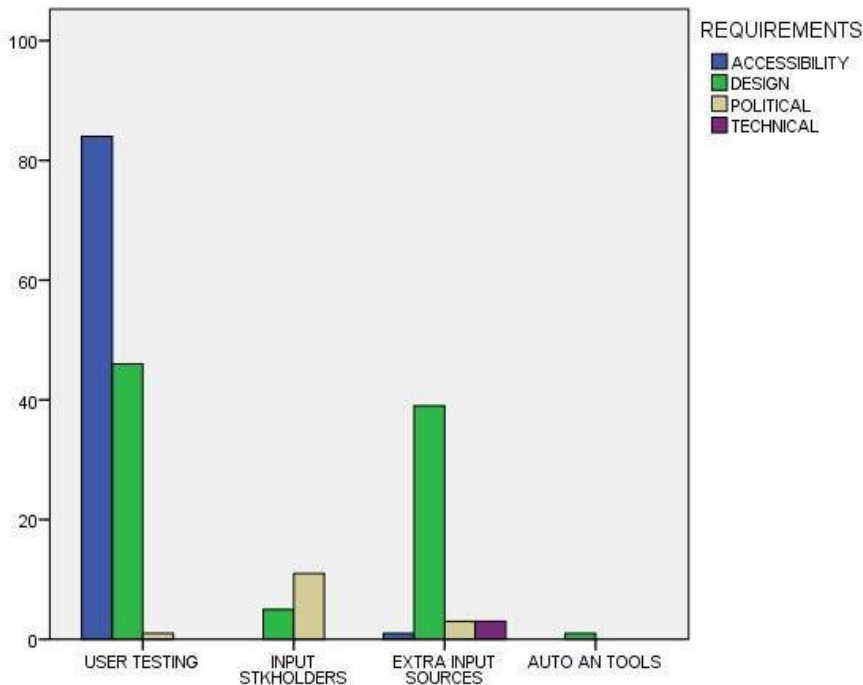
The source of UXR User Testing has supported the most identified constraints related to accessibility issues (Table 16). It was also the source that most helped to detect the constraints to the Design requirement. As said before, User Testing approaches had been applied synchronously, and this allows the UXR researcher to be more detailed in observation and more empathetic in understanding the user's needs.

Table 16 Cross tabulation of valid requirements cases per UXR source

SOURCE		REQUIREMENTS				Total
		ACCESSIBILITY	DESIGN	POLITICAL	TECHNICAL	
USER TESTING		84	46	1	0	131
INPUT STKHOLDERS		0	5	11	0	16
EXTRA INPUT SOURCES		1	39	3	3	46
AUTO AN TOOLS		0	1	0	0	1
Total		85	91	15	3	194

The Input Stakeholders' source that most supported the constraints to the Political requirements (Table 16). Naturally, in the environment of these meetings, the political-institutional discussions that affect the decision-making process prevail. Sprints reviews, as we have said, are the apex of this type of approach.

The constraints to the Technical requirement (Table 16) were almost non-existent. Only three inputs from the UXR Extra source revealed some aspects of the technological field. In one of these cases, the revision made by an expert resulted in conflicting suggestions to the technology resources of the portal development.



Graph 12 Distribution of the number of requirements supported according to each UXR sources

In the bar chart above (Graph 12), it is possible to overview which input sources most helped to support the requirements collection.

4.3.3.2 Recapping the Requirements

The purpose of this section was to show what development requirements UXR fonts have supported: Accessibility, Design, Political, and Technical.

We saw that, in the general scope (joining the collections of all UXR fonts), the Design requirements were the most supported, followed by the Accessibility ones. The Political requirements were the third, and finally, with an insignificant amount of input that caused constraints are the Technical requirements.

We consider that Design requirements obtained a higher number of inputs that generated conflicts because it is an area that involves the whole aspect of the visual and interaction layers, i.e., much more exposed to contact with the public.

Accessibility requirements appear as the second most affected by the inputs received. In this case, the analysis model allowed us to verify only the inputs from tests with users with weaknesses. If the analysis model considered the manual and automatic validation routine, these requirements would undoubtedly have been supported by a larger input volume.

In the third most supported requirements, the Politician, the number of inputs collected was much lower than the others, what can be explained with the actual results of the meetings with stakeholders.

In fourth, the Technical requirements suffered little constraints, which may show that the university was sufficiently prepared to develop the new news area from a technological perspective.

When we observe this same data to know each UXR source's capacity to support the requirements, it is clear that the User Testing methods were more effective in collecting conflicting inputs to the Design and Accessibility requirements. In the Design scope, Extra Input Sources were also useful to identify inputs. The Stakeholders Meetings source was more likely to support the policy requirements. Moreover, finally, the UXR Automatic Analysis Tools font collected virtually no conflicting inputs to the Requirements.

4.3.4 The contribution of UXR sources to identifying Input Typology

In this last analysis, we will show which types of inputs relative to each UXR source's interface dimensions helped to identify. As shown in the analysis model's explanation, we applied the interface dimensions defined by Sousa (2017) to classify the types of inputs collected. We understand that this scientific contribution can be applicable to the interface evaluation of digital products, as the UA portal's new news area. Thus, UXR sources helped to identify the types of inputs:

- Information Architecture (ARQINF)
- Visual (VIS)
- Interaction (INT)
- Social Presence (PSOC)
- User Experience (UX)

- Bug (BUG)

This last typology, "Bug," is not part of the Sousa (2017) model. We decided to add it due to the interest of also checking for bugs during user interaction. In this case, the bugs are events caused by software updates, either due to the type of browser or another issue that interferes with the digital product's complete functioning.

It is also important to reinforce here that the User Experience (UX) typology was only used to classify an input when the emotional manifestations surrounding the user experience were very evident, so this typology obtained low occurrence records. Nevertheless, it is worth pointing out that aspects of the interface's dimensions reflect in the user experience. Thus, by being more rigorous in using the UX typology, we were able to identify which type of input can make the experience good or bad.

In the description of the analysis model (Section [1.3](#)), we explain the meaning of each typology. After cataloging, we arrived at the following table's result (Table 17), where the frequency and percentage that each UXR source helped to collect.

Table 17 The occurrence distributes the values, and the missing cases are collected inputs that could not be classified

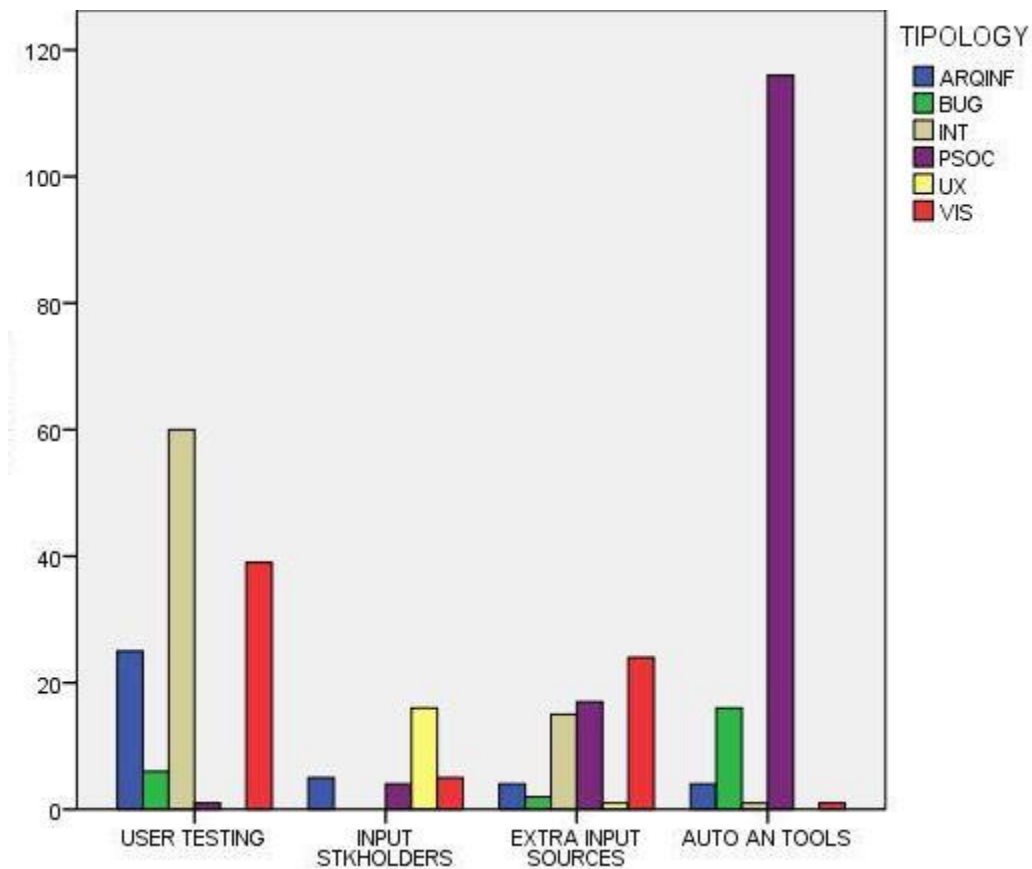
		TIPOLOGY				
SOURCE			Frequency	Percentage	Valid percentage	Cumulative percentage
USER TESTING	Valid	ARQINF	25	19,1	19,1	19,1
		BUG	6	4,6	4,6	23,7
		INT	60	45,8	45,8	69,5
		PSOC	1	,8	,8	70,2
		VIS	39	29,8	29,8	100,0
		Total	131	100,0	100,0	
INPUT STKHOLDERS	Valid	ARQINF	5	15,6	16,7	16,7
		PSOC	4	12,5	13,3	30,0
		UX	16	50,0	53,3	83,3
		VIS	5	15,6	16,7	100,0
		Total	30	93,8	100,0	
	Omitted	999	2	6,3		
Total		32	100,0			
EXTRA INPUT SOURCES	Valid	ARQINF	4	6,3	6,3	6,3
		BUG	2	3,2	3,2	9,5
		INT	15	23,8	23,8	33,3
		PSOC	17	27,0	27,0	60,3
		UX	1	1,6	1,6	61,9
		VIS	24	38,1	38,1	100,0
Total		63	100,0	100,0		
AUTO AN TOOLS	Valid	ARQINF	4	2,8	2,9	2,9
		BUG	16	11,0	11,6	14,5
		INT	1	,7	,7	15,2
		PSOC	116	80,0	84,1	99,3
		VIS	1	,7	,7	100,0
	Total		138	95,2	100,0	
Omitted	999	7	4,8			
Total		145	100,0			

In the following Table 18, it is possible to see the distribution of the inputs in the correlation between UXR typology and the source in a summarized way.

Table 18 In 362 of the 371 collected inputs, it was possible to classify the interface input typology

		ARQINF	BUG	INT	PSOC	UX	VIS	Total
SOURCE	USER TESTING	25	6	60	1	0	39	131
	INPUT STKHOLDERS	5	0	0	4	16	5	30
	EXTRA INPUT SOURCES	4	2	15	17	1	24	63
	AUTO AN TOOLS	4	16	1	116	0	1	138
Total		38	24	76	138	17	69	362

The main interest in verifying this data is to understand which types of inputs relative to the interface's size each UXR source has more ability to identify. It is clear that the specification of a usability test's tasks, what is noted in a News Area, or the type of automatic tool used are factors that interfere with the result of observation and collection. Moreover, all the results obtained in this research were influenced by how the UXR methods were applied in the data collection, as outlined in the Graph 13.



Graph 13 Bar graph. The vertical axis represents the numerical scale of occurrence of cases

From the next boxplot view (Graph 14), we will go over which input types each UXR source can identify. It is important to remember that these inputs can be positive or negative issues related to the interface's dimensions. Next, in each subsection, we will discuss each UXR source's performance in this process, discussing at least the two highest values represented by each one.

4.3.4.1 Typologies inputs from User testing gathering

The User testing source collected inputs from the "Information Architecture," "Bug," Interaction, and "Social Presence" typologies.

Interaction

The source User Testing (sprints 13, 18, and 21) presented great potential for identifying inputs of the interaction typology. It was the only source capable of identifying this type of input in a more continuous way along with the sprints. The "Extra Input Source" and "Automatic Analysis Tools" presented only discrepant and minimum values, according to the boxplot graph, but they weren't useless (Graph 14).

In almost all sprints, the collection of inputs allowed the identification of data about the interaction in the new news area interface. It proves that User Testing methods are great allies for this purpose. When testing a digital product, user behavior may even be a relevant aspect to be observed, but the user interaction with the product is the primary way to ensure that the interaction design was well designed. Personal experiences cause users to construct interaction patterns and replicate mental models when operating a system or product. It directly interferes with the expectations surrounding usability and the stimulus-response process (Dix et al., 2004; Dumas & Redish, 1999; Lazar et al., 2017; Preece et al., 2015).

Therefore, by identifying and solving interaction design issues, the portal team contributed to the news area having an interface that provided a fluid and significant interaction.

The 60 interaction inputs that the UXR User Testing source collected, among compliments and complaints, originated from usability and accessibility tests with the general public, experts, and the blind. The compliments served to ratify a need met, helping the portal team replicate the interaction design on other scales. On the other hand, the interaction problems caused constraints in the Design and Accessibility requirements. Solving these problems means supporting these requirements.

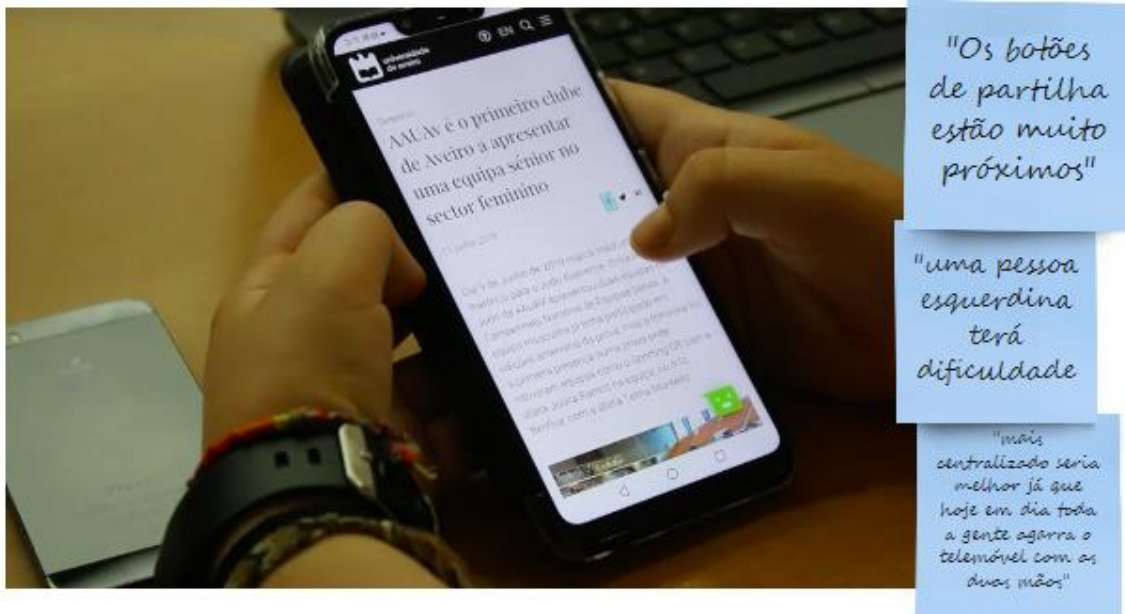


Figure 30 Users reported difficulties in interacting with the social networking buttons. Because they were so close, it was not easy to know which one they were clicking on

Here are transcribed some user lines during the test shown in Figure 30:

“The sharing buttons are very close.”

“Os botões de partilha estão muito próximos.” (in portuguese language)

“A lefty person will have difficulty.”

“Uma pessoa esguerdina terá dificuldade.” (in portuguese language)

“More centralized would be better, since nowadays everyone keeps their cell phone with both hands.”

“Mais centralizado seria melhor, já que hoje em dia toda a gente agarra o telemóvel com as duas mãos.” (in portuguese language)

Visual

The second-largest input typology most collected by the User Testing source was the visual dimension, with 39 occurrences. The visual dimension involves all aspects related to size, colors, contrasts, and textures. See some examples:

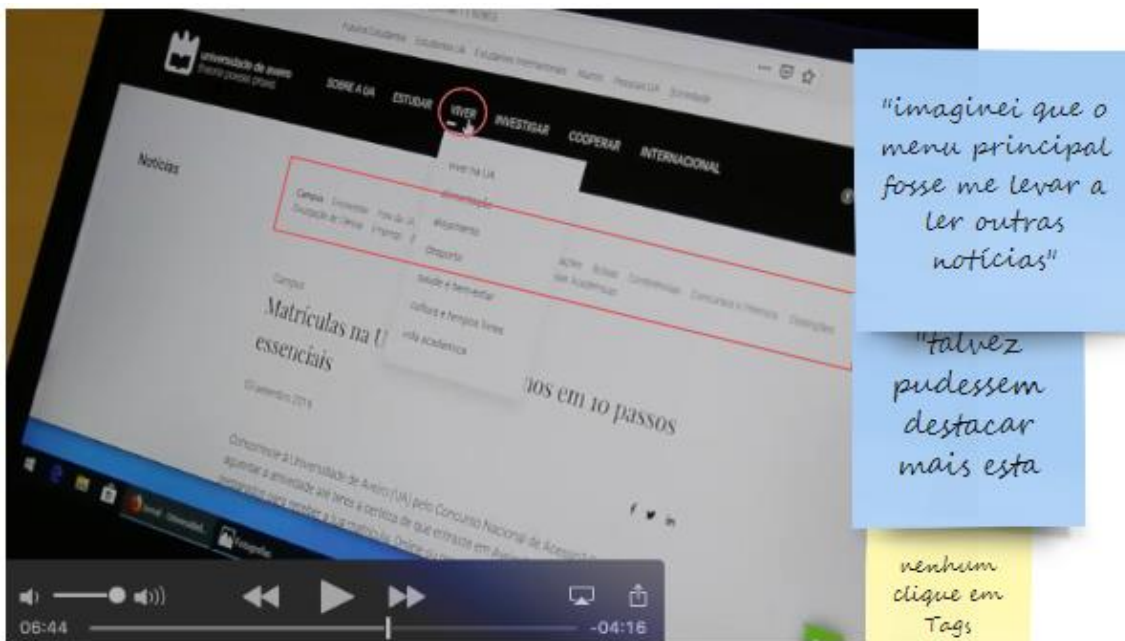


Figure 31 The users had given up the task of accessing the menu of news categories. The menu items had to be enlarged to make the menu more visible. (sprint 13)

Here are transcribed some user lines during the test shown in Figure 31:

"I figured the main menu would lead me to read other news."

"Imaginei que o menu principal fosse me levar a ler outras notícias." (in portuguese language)

"Maybe you could emphasize this part more."

"Talvez pudessem destacar mais esta parte." (in portuguese language)

In sprints 18 and 21, when the same test was performed with accessibility experts and blind people, the identification of visual typology problems was accentuated, as exemplified in the figure of a slide with the conflict touchpoints, shown in one of the discussion meetings of accessibility test results (Figure 32).



Figure 32 Touchpoint Graphic with the issues found by the experts (orange) and the blind (green) presented in team meetings. The [Appendix 3](#) clarifies the information related in this figure

For the blind to see, images must be described. However, this description needs to be satisfactory for the blind to visualize the image in their way, based on the alternative description. It is important to consider that the alternative description is not only a benefit for the blind. Even visuals may need textual information when the image cannot be uploaded due to low internet speed. Of these 39 inputs that show issues related to the visual dimension, 21 were identified by blind people and experts when conducting the same tests as the general public.

Thus, even the problems that apparently generate constraints to the Design also affect the accessibility requirements, since there are rules of minimum font size for comfortable reading and color contrast. Likewise, the alternative text description of images, buttons, and other interface elements must be respected so that the interface's visual dimension becomes accessible to ordinary people, blind, colorblind, and people with other weaknesses linked to genetic factors, environmental or aging.

Bugs

The number of bugs collected by the User Testing source was minimal, six Bugs as is described in the Table 10. Nevertheless, what was reported by the users would affect those who navigate with assistive technology for the blind. A bug generated in a site

update made the assistive technologies unable to access the text of the news itself, preventing the blind from reading.

Social Presence

The desire to share some information about the institution or news shows some input from the dimension of Social Presence. The only input that the User Testing source was able to get, in this case, was when a user said he missed an icon that allowed the sharing of news via email and social networks.

UX

Although User Testing approaches allow an evaluation of the product closer to the end-users, no feedback was collected in which the emotional aspect concerning the product had been verbalized, either denoting satisfaction or dissatisfaction. This result can also be justified by the script of the tests.

4.3.4.2 Typologies inputs from Stakeholders Meetings

The Stakeholders Meetings source collected inputs from the "User Experience," "Visual", "Information Architecture", and "Social Presence" typologies.

User Experience

Of the 362 types of inputs identified, 30 were from the source of UXR Stakeholders Meetings. Despite the low amount, the data from this collection method significantly contributed to highlight the emotional evidence related to the User Experience (16 inputs). One of the situations where this was evident was at a feedback gathering meeting with blind stakeholders. They are rectory employees who provide customer service over the phone and use the UA portal as a resource. We asked them what they thought of the institutional video with accessibility (an example mentioned in this chapter of the discussions). They had been consulted by Communication Service agents to explain how image description phrases for videos can be elaborated, but they had not seen the video ready. In sprint 20, when the video was released in the institutional highlights area, we questioned them to get their feedback.

The entire testimonial can be found in the Appendix (section [1.3](#) and [4](#)), but we will show the excerpts that highlight the relationship's emotional aspect with the product:

Extract 1:

"Well, that even moves, wow! You bet it does! That is pretty cool!" (Testimony of the blind man with hands-on his face crying)

"Epá. Isso até comove, fogo! Podes crer!! Tá muito fixe!" (in portuguese language)

Extract 2:

"You bet!" (The same blind man crying. He stood up and embraced the researcher. Because of the hug, the researcher lost the camera angle). *"We feel what our needs are. Often, the designers, even the accessibility designers and so on, etc. When they say, "Ah, let's do it like this," but what they find in the office, what they see in the computer is not what we find in practice. You did the work starting from the foundations, not starting from the roof, like many people who want to do work for inclusion but know how to do it because they start from the top. Why this? Because you don't consult the people who have the right feeling, the exact feeling, the real one. You have a partial sensation; you imagine that it must be like this. Many times, it's not what you imagine."*

"Pode apostar!" (O mesmo homem cego a chorar. Ele levantou-se e abraçou o investigador. Por causa do abraço, o investigador perdeu o ângulo da câmara). *"Sentimos quais são as nossas necessidades. Muitas vezes, os designers, mesmo os designers de acessibilidade e assim por diante, etc. Quando dizem: "Ah, vamos fazer assim", mas o que encontram no escritório, o que vêem no computador não é o que encontramos na prática. Fizeram o trabalho a partir das fundações, não a partir do telhado, como muitas pessoas que querem fazer trabalho para a inclusão, mas sabem como fazê-lo porque começam do topo. Porquê isto? Porque não se consulta as pessoas que têm a sensação certa, a sensação exacta, a verdadeira. Têm uma sensação parcial; imaginam que deve ser assim. Muitas vezes, não é o que imagina".* (in portuguese language)

Extract 3:

"It transmitted to me personally a great emotion." (Feedback from the other blind guy in the department)

"Transmitiu-me pessoalmente uma grande emoção". (in portuguese language)

Extract 4:

"As a customer, I am delighted. I think it was an excellent bet. I don't know who the mentor of this audio-description was, but you said there were many, but it was an extraordinary idea. In fact, it was really worth it". (Reaffirmed the other blind man in expressing his own satisfaction)

"Como cliente, estou muito satisfeito. Penso que foi uma excelente aposta. Não sei quem foi o mentor desta audio-descrição, mas tu disseste que foram muitos, mas foi uma ideia extraordinária. Na verdade, valeu mesmo a pena". (in portuguese language)

On the same day (within Sprint 23), the blind's testimonies were shared with the stakeholders representing the institutional agents and the development team of the new UA portal. Similarly, as they saw the feedback from the blind, the stakeholders were also moved.

As a result, the socialization of the users' feedback with the team helped increase the team's motivation and the institutional agents to defend the requirements necessary for developing the digital product. Therefore, feedback meetings with stakeholders are so important (Farrel, 2017).

Visual

In Sprint 15, five cases of inputs related to the visual dimension had registered. It was in a meeting with institutional agents to give feedback about the new layout of the new News area.

In this first example, we will show a testimonial that denotes a compliment:

"The News page is more modern than the actual website, and with a strong bet on images." (Stakeholder meeting testimonial from institutional agents)

In the second example, a statement by an institutional agent highlights a need:

"I think it is necessary to reduce the spacing so that the screen shows more content in the highlighted area" (statement of an institutional agent in the same meeting).

These declarations refer to Figure 24 (present in Section [4.3.2](#)).

Information Architecture

Five inputs were collected in the same meeting that helped identify the information architecture dimension's needs. One of the most discussed examples at the stakeholder meeting was the reorganization of the category menu of the news area.

In the first version of the interface, the news menu had a list of 16 categories: Campus, Interviews, Outside the UA, Culture, Sports, Opinion, Publications, Scholarships, Conferences, Contests and Awards, Distinctions, Dissemination of Science, Jobs, Education and Training, Research and Academic Exams.

The list of links was so extensive that even in the desktop version, it occupied two lines (Figure 33).

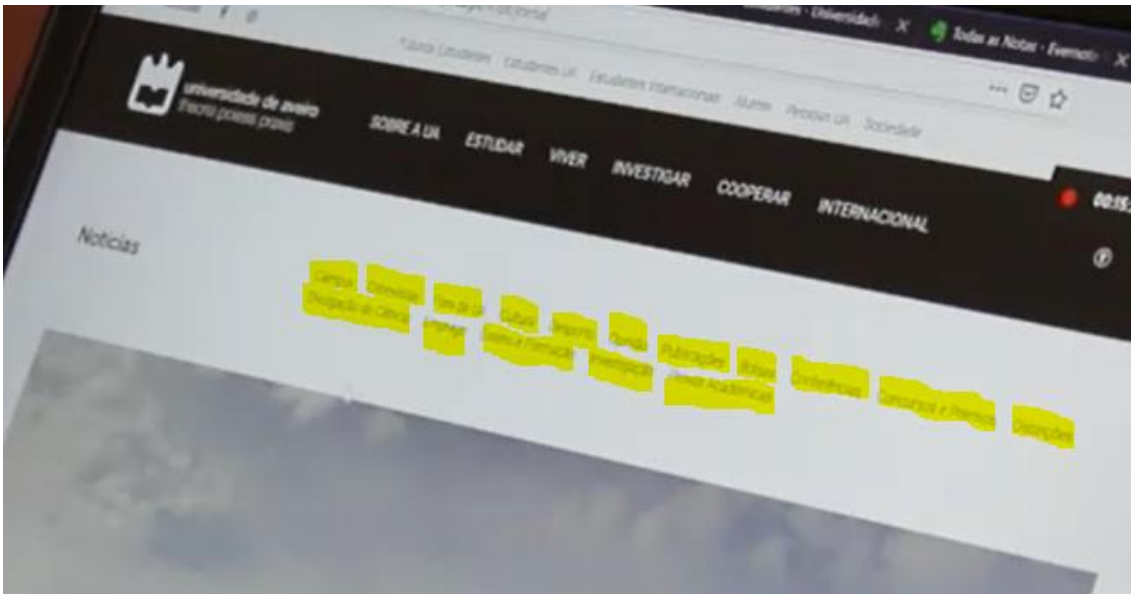


Figure 33 Highlighted in the image is the first version of the news categories menu, in a usability test session. There were 16 links in two lines

As a result of this meeting with institutional agents, the menu items were cut in half, leaving eight links: Campus, Research, Education and Training, Culture and Sports, Awards, Conferences, Interviews, and Opinion (Figure 34).

Figure 34 After the usability tests and the stakeholders' meetings, the menu items had halved, turning the page cleaner

Thus, we found that meetings with institutional agents were also important for decision making related to information architecture. Moreover, being a digital product of an educational institution, the organization of the interface elements is the fruit of the agents' decisions, even if they need to be changed to meet user needs collected in UXR approaches.

Social Presence

Also, at Sprint 15, the stakeholders' meetings resulted in collecting four inputs related to Social Presence. See what one of the institutional agents said:

"My compliment to the portal and to the news page, which kept the same identity (of the portal)." (Statement of an institutional agent in stakeholder meeting after the launch of the new news area)

When referring to the "identity," the institutional agent highlighted one of the nuances of Social Presence: the image that a brand or institution represents for a user of a product or service. By looking at the interface, the institutional agent wanted to express the concept of a modern and renewed university represented in the new interface.

An interface can be a social representation of an institution's identity.

Bug and Interaction

During the meetings with stakeholders, no mention had been made of any input related to Bugs or Interaction.

4.3.4.3 Typologies inputs from Extra Input

The Extra Input source collected inputs from the "Visual", "Social Presence", "Interaction", "Information Architecture", "User Experience and "Bug" typologies.

Visual

"Ah! So, it's not because I wear the glasses today that I see better!" (social network user testimonial).

The humorous commentary to a Facebook post exemplifies a user's compliment for an adjustment in the news area texts' font size. This feedback is one of the evidences of another need met within the Visual dimension of the interface. Increasing the font size of texts was a need identified in stakeholder meetings and usability tests. However, the commentary on the social network made exponentially served to ratify the right decision to improve the portal's visual aspect and give users more reading comfort. There were 24 inputs linked to Visual that this source of UXR helped to identify. As we have already said, the commentaries in social networks were considered one of UXR "Extra Inputs" indicators. Not because it was the best way to evaluate a product, but to make these comments serve as inputs to help highlight this type of situation. It is the value of UX research approaches, considering data collection on social networks. Knowing what people are saying about a product or service can help understand the "real world." (Levy, 2015) They are like those conversations at the bar or cafe where people reveal precious information about themselves and the product in a more natural way.

Social Presence

"Another step towards the renewal of the UA portal, a work that is due to a large team of various services and departments, with students, teachers and technical, administrative and management staff. Congratulations to all!" (user comment on Facebook).

By mentioning the renewal of the University of Aveiro on the web, the user makes an institutional feature explicit, stating that the university has modernized itself to update

the image of its presence on the web. The other evidence that allows us to measure the Social Presence dimension was the recognition given to the community members involved in the construction of the new UA portal, as a group that represents the entire academic community.

Several examples illustrate Social Presence as a characteristic of the 17 inputs. In this other example (Figure 35), users make jokes comparing impressions between the new face of the portal and the old's interfaces.

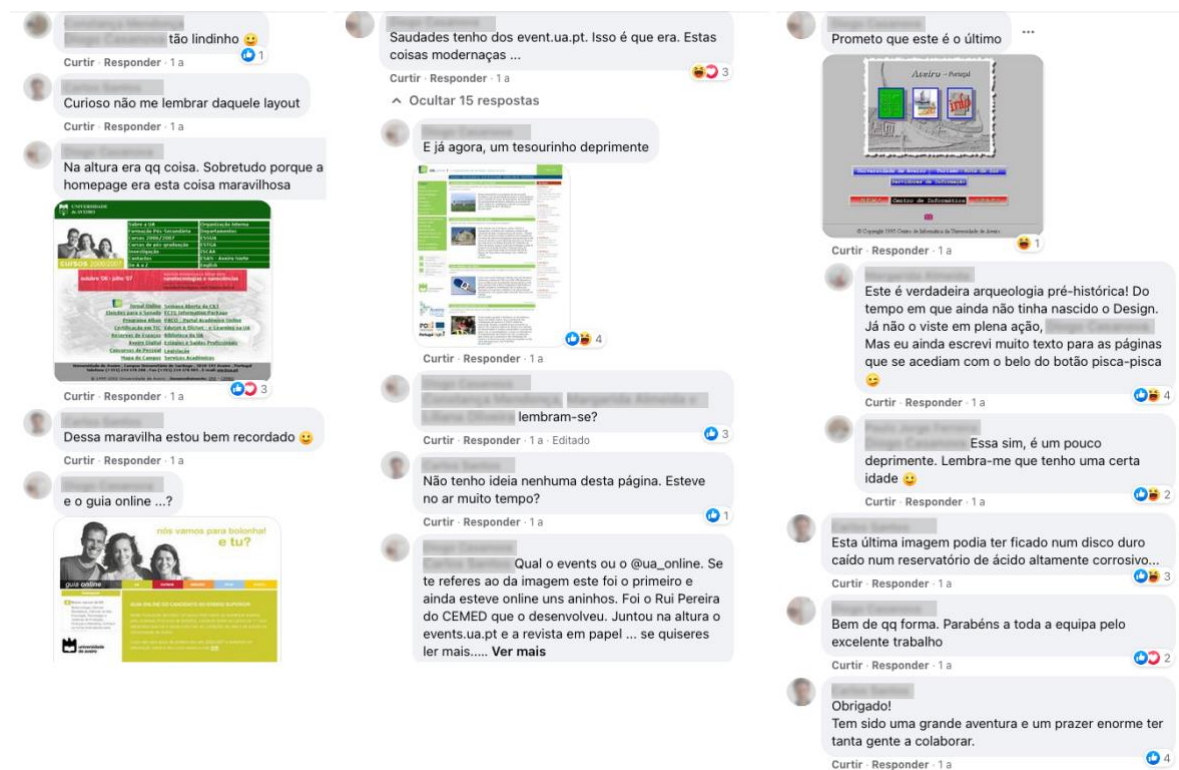


Figure 35 Screen Prints of the Facebook regarding the post made by the project coordinator of the new UA Portal

Knowing how people relate to the digital product and how it can be useful in their lives can benefit the development strategy.

Interaction

*"Yes, it is better (automatic slider in the highlights). Often, the second and third highlights changed and were not noticeable" (social network user comment, Sprint 15).
"Sim, é melhor (deslizador automático nos destaques). Muitas vezes, o segundo e terceiro destaques mudaram e não percebemos". (in portuguese language)*

This other commentary in social network exemplifies one of the 15 inputs that characterize the Interaction dimension. The user pointed out that the interaction with the institutional highlights in an automatic slider format (Figure 36) helps the user find new highlights. Without the automatic slider, the slider passing arrows were not satisfactory from the interaction point of view.



Figure 36 The automatic side slider's activation made users better understand the slide mode arrows in the institutional highlights area

The expert reviews done in an unplanned way are also part of the UXR Extra approach group. In this next example, an ex-student of the institution makes a complaint about not making a text selection, revealing a severe problem of interaction.

"All this text is not selectable?" (the comment was taken from an excel spreadsheet with the feedback of a specialist in sprint 23).

"Todo este texto não é selecionável?" (in portuguese language)

Upon receiving the report with all the observations, this feedback was added to the development backlog to solve the problem identified in an expert review during a last-minute institutional visit.

The report subject can be seen in the Appendix [1.4](#) and [2](#)).

Information Architecture

The expert reviews are also part of the UXR Extra approach group. In this next example, an ex-student of the institution makes a complaint about not making a text selection, revealing a severe problem of Information Architecture.

"Is there an archive that allows you to see the news sorted by date?" (asked the expert in his report, Sprint 23).

The expert review was beneficial to inform the portal development team about four issues related to Information Architecture. One of them is about the example shown in the feedback phrase in the expert report. As a user, he felt hampered in not being able to sort the news of a specific editorial category by date of publication or another sorting (Figure 37).

The alternative solution found by the portal team was to keep adjusting the news cards by entering the date and maintaining the logical sorting of the news by chronology. The news search also had replicated in a tab of the leading portal's top menu search tool.



Figure 37 The image shows in prominence the specification of the news's date as a result of the specialist's suggestion

As people with knowledge in the area perform the expert review, issues not detected by the development team end up clarified with the help of professionals who have no involvement with the development of the interface. In this aspect (Nielsen, 2001) defends the revision of specialists through heuristics to assure the evaluation quality.

Bug

The UXR Extra Input approaches helped detect two Bugs. One of them was collected right after the release of the new news area. On Facebook, one user commented:

"I even went to see, but what I noticed is that the boxes below the news, when they have text on the left side, this appears partially cut, there is no point in scrolling to the left. It's a problem to solve, right?" (user comment on Facebook, Sprint 15).

When checking the feedback, the development team found that a Bug that changed the news area interface made one of the modules strangely scroll sideways.

Thus, the UXR Extra font was an ally for bug fixing.

User Experience

During the expert review, an input of the UX dimension was reported. The expert was bored with not being able to walk back and forth on the news calendar.

"The UX of the calendar by going backward and then allowing it to go back was not something I realized right away." (expert comment, Sprint 23).

The slide effect of the arrows worked to move forward or backward on dates, but the lateral content on the event did not match (Figure 38). The design team solved the frustration reported by the expert by removing the side arrows.



Figure 38 Side navigation arrows on news dates have been removed

The news is associated with the portal's agenda. It is one of the ways that users have to reach information of the day.

It may even be a problem related to the difficulty of interaction, but as the expert reported it was a frustrating experience, this input had classified in the UX dimension.

4.3.4.4 Typologies inputs Automatic Analysis Tools

The UXR source "Automatic Analysis Tools" also made it possible to classify 138 inputs collected by identifying the interface dimensions.

Social Presence

The number of inputs classified in the Social Presence typology was considerably perceptible. The messages sent by users via Hotjar showed 116 occurrences related to Social Presence. Before we show some examples, it is essential to remember that the UX evaluation layer had been disregarded in the data analysis obtained via Hotjar. The reason is that Hotjar offers a Likert scale in emojis (Figure 39) that represents the satisfaction level. This layer precedes all incoming message inputs, i.e., it is offered as the first feedback option (Figure 40). Since the Likert scale for gauging emotions was not a cross-sectional metric in all UXR sources, only those feedbacks in which the user expressed feelings and emotions verbally had classified as UX typology. Thus, the inputs of the second layer of Hotjar, the text messages, were considered.

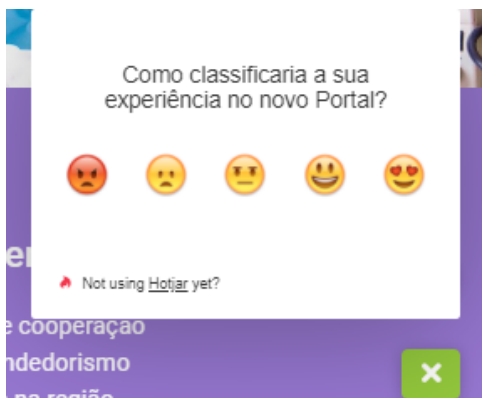


Figure 39 First layer, emojis scale to classify the experience

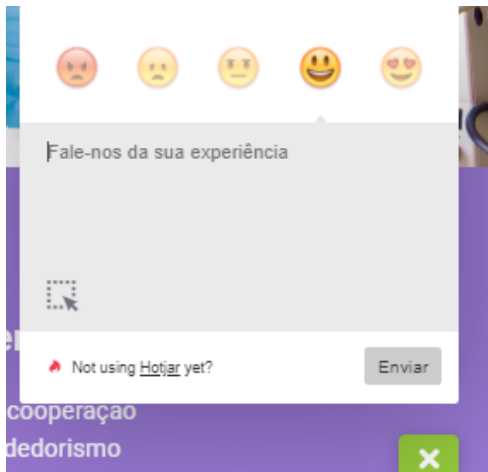


Figure 40 Second layer, text input box

Therefore, if the person verbalized the experience of use in a textual way, the UX input was considered valid in the second layer.

Let us see some examples of received messages denoting the aspect of Social Presence:

"Without a doubt, physical activity is fundamental for everyone, young and old. Zumba classes, gold." (Hotjar user 1501, Sprint 16)

"Sem dúvida, a atividade física é fundamental para todos, jovens e idosos. Aulas de zumba, ouro." (in portuguese language)

"Hello. I would like to thank you for helping me rescue the seals from the sea and this is the reason why I am contacting you. Do you have the contact of the department that manages the costs for their feeding? I would like to help you and my colleagues. Sincerely" (Hotjar user 2107, sent on sprint 23)

"Olá. Venho desde já agradecer-vos terem ajudado a resgatar do mar as focas e é esse motivo que me leva a contactar-vos tem o contacto do departamento que gere os custos para a sua alimentação? Sou Teresa Cardoso e gostaria de ajudar vocês e os meus colegas."(in portuguese language)

The two examples above portray the inputs of the Social Presence dimension. When sending messages interacting with the news content, the users speak as if they were talking to someone. The interface takes on a personality so that people forget they are interacting with an interface once they express themselves as if they were talking to

someone or sending a message to someone they know. In fact, by reacting to the news, people are "talking" with the institution. It shows that the university's social presence is transposed from the "real world" to the digital interface, which highlights the paradigm of Human-Computer Interaction (Norman, 2018; Jenkins, 2006).

In the same way, the example to follow of Social Presence is explicit in a message where the user thinks he is talking to someone: *"I don't know how to express an opinion, because I have just entered."* (Hotjar user 1942, Sprint 18).

It is essential to point out that an element in the Hotjar interface can influence people's behavior when sending messages as if they were talking to someone. The following image (Figure 41) shows the interface of the incoming Hotjar button, like someone smiling.

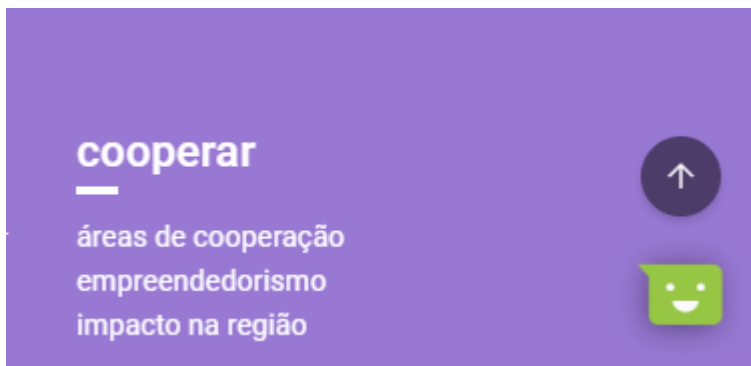


Figure 41 Incoming Hotjar button in the bottom right corner, where the user clicks to send feedback

Notice that the button seems to have a humanized look. Instead of a simple dialogue stick, there are two eyes and a smile. This bot-like appearance can induce people to dialogue as if they were talking to a bot. Of course, there would be a search to ensure this assumption. However, the button's appearance gives evidence that the appearance of a smiling chatbot can influence how people interact with the portal via Hotjar.

Bug

The Hotjar Automatic Analysis tool made it possible to receive 16 inputs to the UA portal's new news area that did classify as Bugs, as in the Figure 42.

*"Blank page cannot be access any page." (Feedback from Hotjar user 1615, on Sprint 17).
"Página em branco não se consegue aceder a nenhuma página". (in portuguese language)*

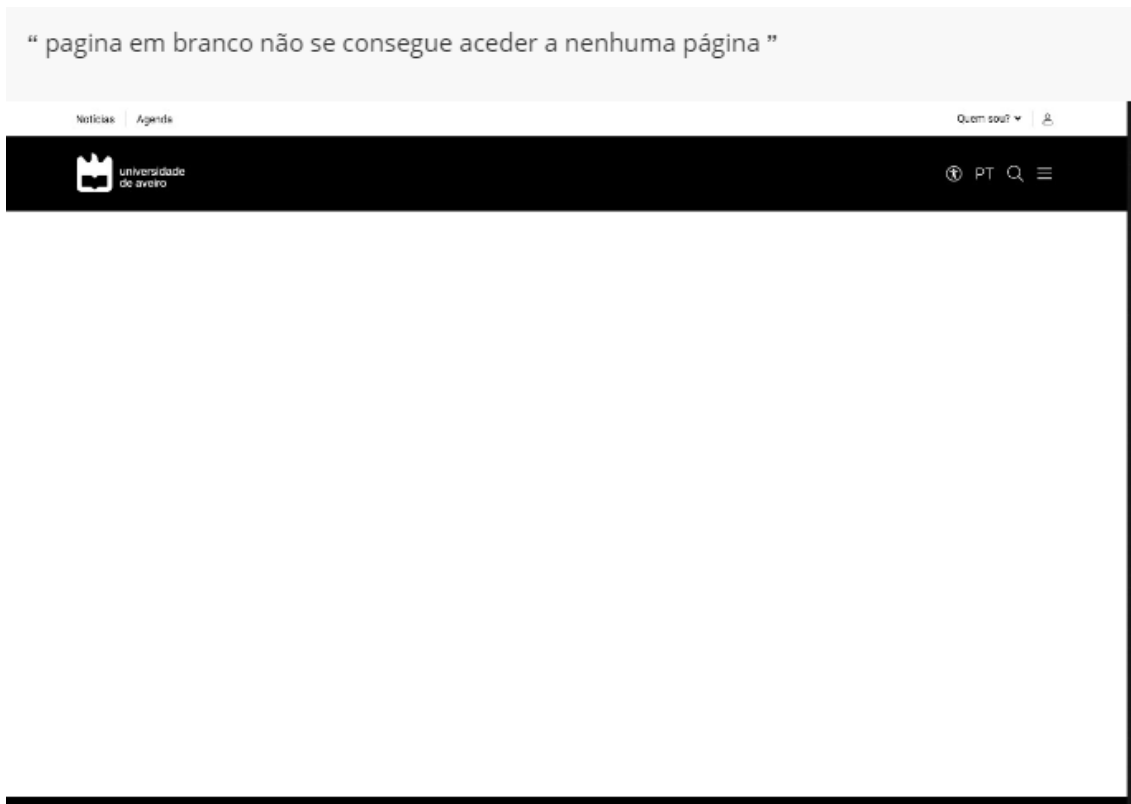


Figure 42 The Hotjar Dashboard with the message and automatic printscreen of the problem reported by the user

As we have already mentioned in other parts of this study, these types of feedback were common when some version of the site was updated. With the feedback obtained via Hotjar, the development team understood the possible cause of the bug and solved the problem.

Information Architecture

Four inputs collected via Hotjar were classified in the Information Architecture dimension. These are situations similar to the example below:

"I have difficulty in finding what I am looking for." (Feedback from Hotjar User 1548, Sprint 16)

"Tenho dificuldade de encontrar o que procuro."(in portuguese language)

The difficulty of finding some information can be a sign that the user has difficulty understanding the organization of information in the site's structure, as in Figure 43. The information architecture is what allows the user to understand how the content had arranged in an interface. This type of problem has caused the portal to seek to reorganize the distribution of content. As we have already explained in the requirements analysis, many proposals regarding information architecture have not advanced because of political-institutional constraint.

“ Tenho dificuldade em encontrar o que procuro ”

de networking. O programa desta semana foi desenhado pela UACOÓPERA, a Universidade de Aveiro Incubator e um vasto grupo de docentes que lecionam ou dinamizam projetos ligados à área do empreendedorismo.

No decorrer desta semana serão focadas várias temáticas cruciais ao desenvolvimento de uma ideia de negócio e de uma empresa, nomeadamente: Financiamento, Inovação, Modelo de Negócio, Design Thinking e Storytelling. Serão ainda dadas a conhecer algumas iniciativas externas de apoio ao empreendedorismo, estando igualmente prevista a realização de mais um Encontro de Mentores.

O programa da Semana contempla, assim, o envolvimento de representantes de várias empresas e entidades que irão partilhar com os presentes não só o trabalho dinamizado, como as oportunidades existentes para alavancar novos projetos empreendedores. A organização conta com a presença, entre outras, das seguintes entidades: Portugal Ventures, Amilar, COREangel, PPL crowdfunding, a Santa Casa da Misericórdia, Aliados Consulting, Inova +, Bosh, Navigator Company, Altice, Beeverycreative, Aveiro Smart Business e Today Patents.

A semana encerra com o startup weekend, um evento de imersão em inovação e tecnologia, o qual desafia os participantes a transformar uma ideia de negócio numa startup durante * horas.

A participação nos diferentes eventos da Semana é gratuita, no entanto deverá ser formalizada aqui, até ao dia * de novembro.

Consulte o programa detalhado em anexo.

 Tags: Empreendedorismo mentores uacoopera

Figure 43 Automatic print screen is generated by the Hotjar tool when the user clicked the incoming message button

We must consider that the user does not make an explicit reference to what content he was looking for. One of the factors that weaken the use of Hotjar is that the automatic print screen did make it to the page where the user clicked on the feedback button. In other words, the user can have a bad experience in another area of the portal, but only when he enters the news area, he clicks on the feedback button. So, as the software automatically prints the screen that preceded the click on the feedback button, the image received was a text from the news area.

Interaction

"It is difficult to pass the news to PDF or even to make a print screen of the news because being very narrow the page the news ends up being very long." (Hotjar User 1517, Sprint 16)

"É difícil passar as notícias para PDF ou mesmo fazer um print screen da notícia pois sendo muito estreita a página (d)a notícia acaba por ficar muito comprida." (in portuguese language)

The only problem typified in the Interaction dimension is feedback sent by a user who did not have a successful interaction to print news in PDF format. The Figure 44 illustrates the problem and the solution is in the Figure 45.

“ É difícil passar as notícias para PDF ou mesmo fazer um print screen da notícia pois sendo muito estreita a página a notícia acaba por ficar muito comprida.”

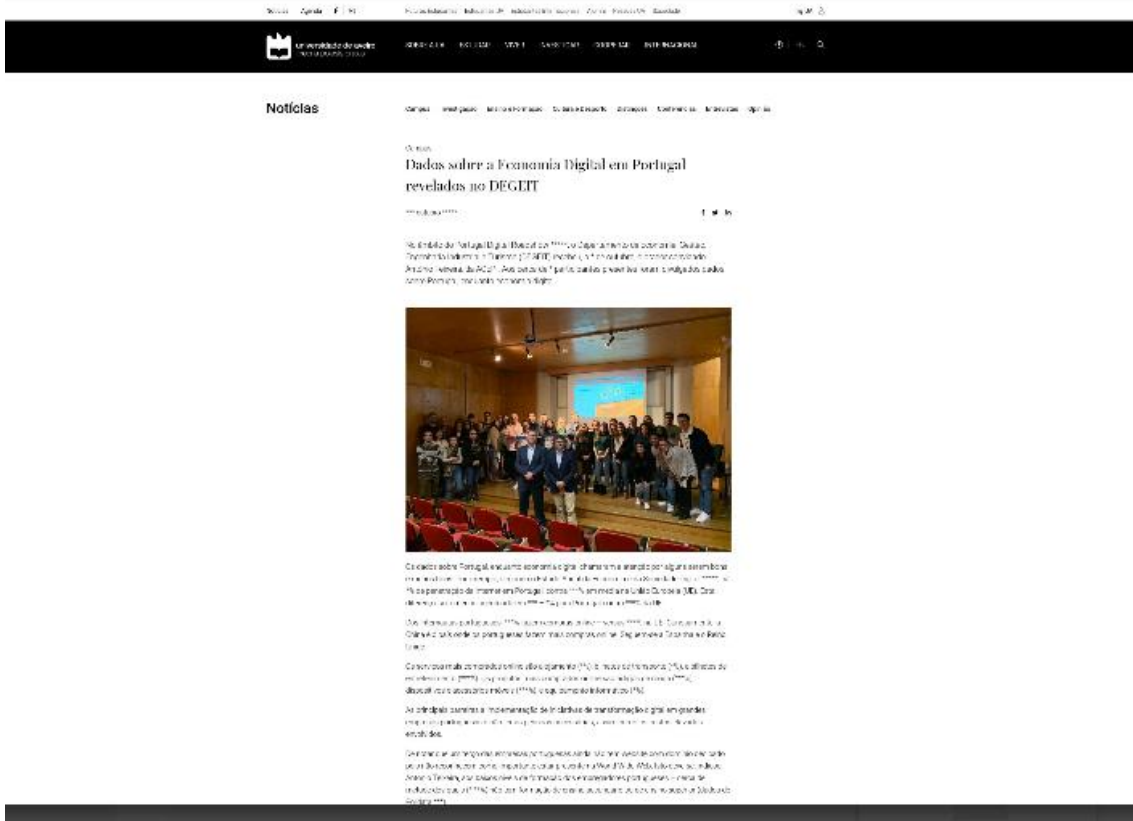


Figure 44 The complaint (received from Hotjar) about interaction to save the content in PDF format

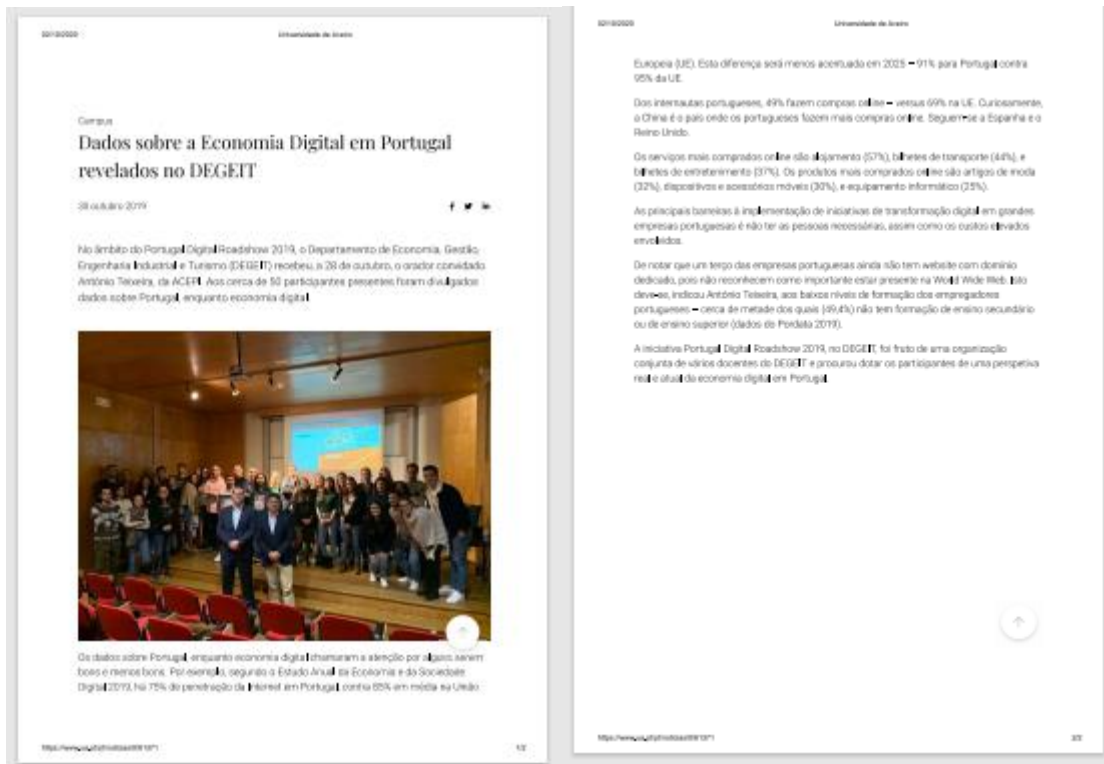


Figure 45 The solution to meet the complaint with a version of the same news in PDF format

Here is an example of the solution adopted to solve the problem reported by the user in the image above. Instead of an extensive and reconfigured pdf, the print was organized by pages, keeping the news header and page numbering.

Visual

Feedback classified as Visual dimension was not frequent as the others inside this UXR source. The only case found was that of a User who complimented the visual aspect of the mobile version.

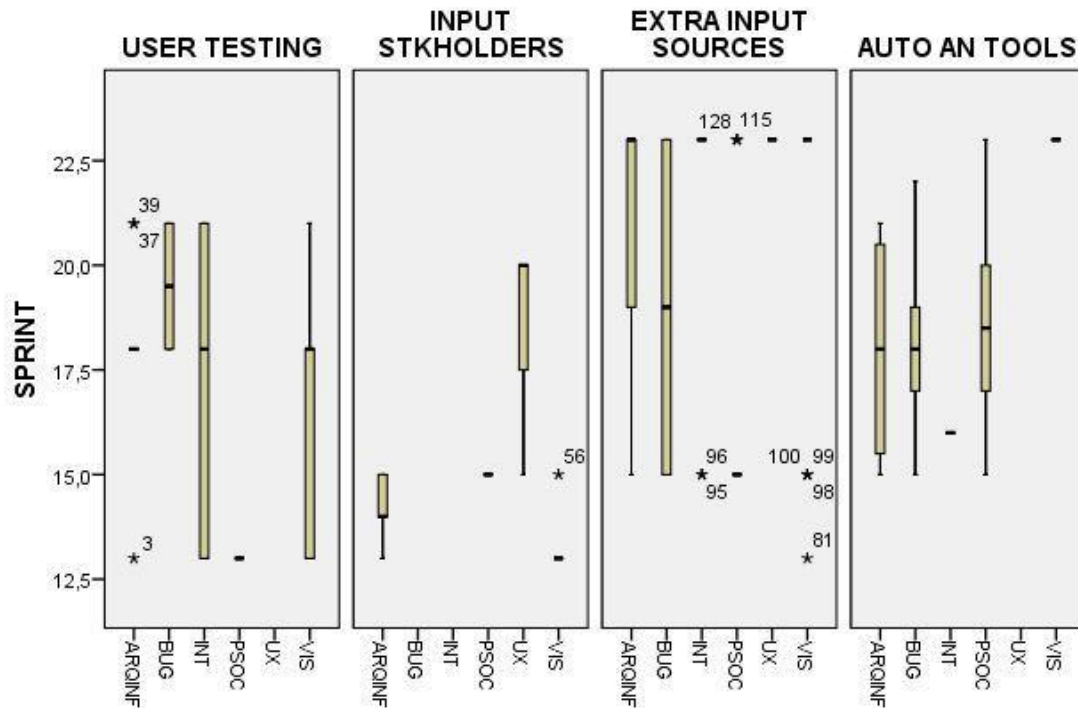
Experience of Use

As we have already explained here, the Hotjar Likert scale's emojis were not considered because they are a mandatory layer of the interaction tool. The purpose was to perceive the contributions in spontaneous verbal expressions, so this dimension had zero value in

this analysis. Nevertheless, if emojis interactions were valid, the Likert scale ranking would have generated 144 inputs of the UX dimension.

4.3.4.5 Recapping: Inputs Typologies

In this section we have discussed the results regarding the input types that each UXR source helped to identify. These typologies were adapted from Sousa (2017) interface Dimensions Analysis Model: Information Architecture, Visual, Interaction, Social Presence, Use Experience, and Bug. The UXR sources proved that they are data collection mechanisms to assess a multiplicity of interface problem typologies. The User Testing source has proven to be a robust approach to identify issues in the Interaction and Visual dimensions. Stakeholders Meetings helped mainly to collect inputs linked to the Use Experience (Emotional involvement). The Extra Input source, formed by data collected from social networks and expert reports, helped identify various typologies, including Visual, Interaction, UX, and Social Presence. By yes, Automatic Analysis Tools proved to be a relevant source for identifying issues related to social presence, and secondarily for Bugs.



Graph 14 The input types are grouped by the UXR source's nature and distributed on the vertical time axis, between Sprints 13 and 23

The boxplot graph (Graph 14) above summarizes the distribution of the problem types identified by each UXR source. The dispersion of quartiles, tails, minimum values, and outliers positioned between sprints 13 and 23 (12.5 and 22.5).

Chapter 5 - Main scientific contributions

The work of Quivy & Campenhoudt (2005) in the field of scientific research methodology helps us to understand the relevance of a well-structured observation. In this sense, the analysis model made it possible to go to the observation field. The data collection's scientific work showed that a vision inspired in the Grounded Theory (Villiers, 2005) was somehow predominant in this research. Indeed, all data obtained was originated from UXR methodologies observed during this investigation. The systematic collection and refinement of data were fundamental to the hypothesis testing. This data saturation process (Villiers, 2005) helped us to understand and structure a proposed UXR model in an Agile context, that we will explain in this section.

The study conducted to verify the central hypothesis and the three secondary hypotheses helped us to observe the role of UX Research in the Digital Media industry. Knowing the principles of Human-Computer Interaction and observing their practical application in an Agile development environment undoubtedly contributes to the critical reflection of how each scientific achievement so far has interfered with the definition of UX practices, dynamics, and principles.

Facing everything that was observed along with the 11 sprints of the development roadmap of the new news area, allowed us to draw a proposal of methodology or UXR flow approach (Figure 50) for the development of digital interfaces in the context of European higher education institutions, taking as an example what was observed throughout this period of research at the University of Aveiro.

This proposal started initially from the observation flow itself made possible by the analysis model: Inputs, Requirements, and Delivery Solution.

Summarizing, this model (Figure 50) would be structured as follows.:

1º Incomes: Needs, problems, suggestions, and all types of inputs collected by UXR source or Stakeholders representing the Institutional Agents or Sponsors of the product to be developed.

2º Support to requirements: The previous step's inputs can only proceed if they meet the product development requirements (Accessibility, Design, and others). If the

input moves forward to development without meeting a requirement, the risk is to have a product that does not conform and may represent a loss upfront. However, if the input enters the flow and causes some constraints to one of the requirements, the next step begins.

3º Awareness: stakeholders and the development team are sensitized to meet the requirements. It is the phase in which those involved are made aware of guidelines and standards.

4º Bottom-up approach: this is the stage where empathy should be stimulated. It made stakeholders and the team aware of why a particular requirement needs to be met and how this interferes with the end user's daily life. At this stage, the digital product goes through adaptations or has the problems corrected.

5º Approval: here, the development team checks if the changes or corrections meet the product requirements. It is self-regulation, once again, being put into practice.

6º Feedback Registration: After being approved by the requirements, the product is delivered to the user. The interaction, reactions, and feedback must be recorded.

7º Feedback sharing: End-user's feedback is shared with the team. The intention is to show that all the effort to meet the requirements can result in user satisfaction. Sharing feedback becomes a new input. It is input to sensitize those involved in the process and make them advocate for the end-user and be advocates for the requirements.

During the research, we could observe several situations, for example the case of the accessibility video, that can be represented in the methodological flow described in the Figure 46. This model of UXR approach was proposed by us and is called *The Empathy Flow*.

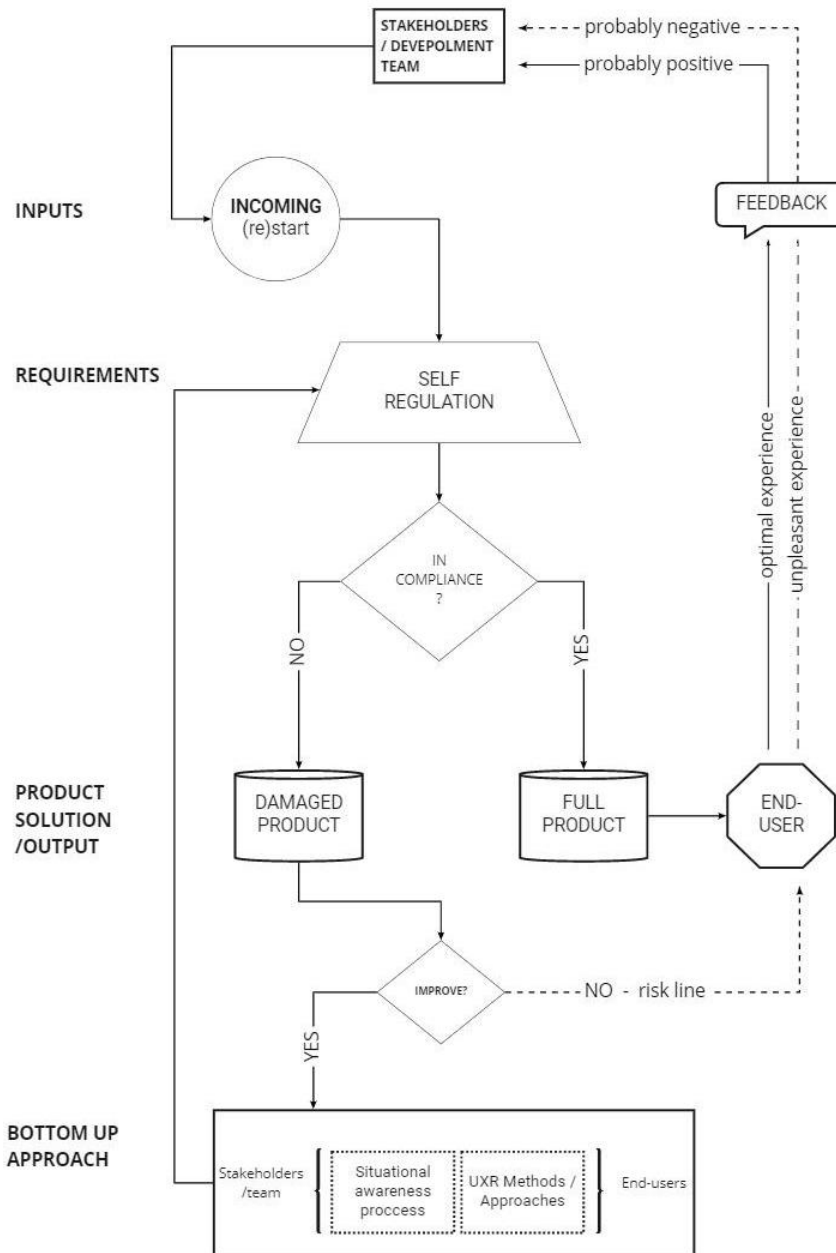


Figure 46 The Empathy Flow (proposed by the authors)

During the research, we could observe several situations that can be represented in this model as, for example, the accessibility video.

Following the "start" point of the model, an input entered the development cycle: a request from the Institutional Agents for a video to be inserted in the portal's highlights area.

Upon receiving this input, the portal team put into action the Self-regulation process, that is, look at that video (input) and check if it complies with the requirements. The verification was that it was not in conformity with two requirements, Accessibility and Technical. In the field of Accessibility, the video should comply with the following WCAG2.1 (W3C, 2019) guidelines:

- Subtitles, voice-over audio description (in Portuguese and English)
- Sign language (Portuguese and English)
- Keyboard access to the options button to watch video with audio-description
- Keyboard access to the video control panel (start, pause, volume, and others)
- Auto play mode lock

(Source: General Report of the UA Portal Application for the AMA Gold Seal of Accessibility and Usability).

If the team was permissive to the video failures in the self-regulation process, the Portal would lose the triple-A Accessibility Level (W3C AAA) and would not deliver an accessible product to all people in the academic community.

To meet the Technical Requirements, the Development team started a series of adaptations to the highlights module to support videos. As the highlights area only supported images, the module was programmed to support embedded videos. Besides, a new component was added, called the audio-description button (Figure 47), positioned on a layer before the play button to connect to the accessible video version on the top right-side of the screen (Figure 49).



Figure 47 Icon/button of audio description

Concerning the product, the video, re-edits were necessary to add all the basic accessibility requirements described above.

Nevertheless, in order to do all this, the evaluation team started a bottom-up approach. It would not help to dump a set of W3C rules. Therefore, several meetings were held with the development team and the institutional Agents to make them aware of how a blind or deaf person can have access to audiovisual content (Figure 48).

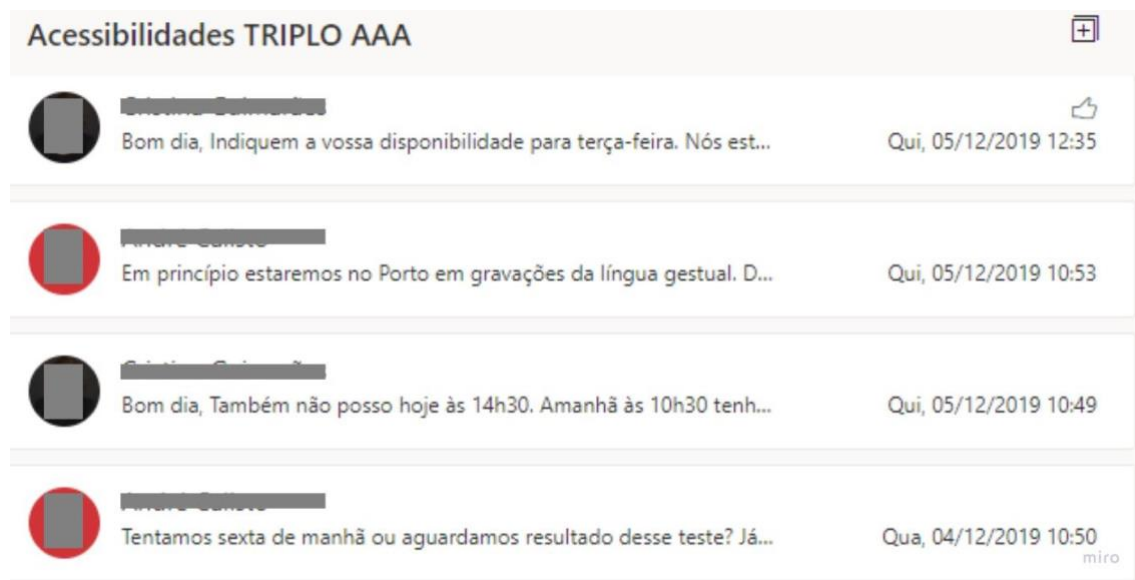


Figure 48 Print of the e-mail exchanges between the evaluation team and institutional agents responsible for producing the institutional video, scheduling meetings on accessibility in videos

Besides orienting with a set of information, we seek to bring the Institutional Agents closer to the people with weaknesses who work in the institution. The video team started to understand how the audio-description texts could be elaborated to help the blind see what is happening in the image.

The video script was adapted for audio description (in English and Portuguese) and subtitles in both languages and sign language in English and Portuguese were included.

After this stage, the new versions of the video were inserted in the highlight's module (Figure 49).



Figure 49 The video screen in accessibility mode in institutional highlights. Detail for the "AD" button to access the content in the Audio-description

When the video became public, the UA portal evaluation team went to the department where the blind work to get their opinion. The feedback highlighted the extreme satisfaction of the blind to the team's surprise to the point where they cried with

emotion. There were many hugs and intense compliments to all involved in this process (Figures 50 and 51).



Figure 50 Image of the moment when the blind user watches the video for the first time and starts to feel touched

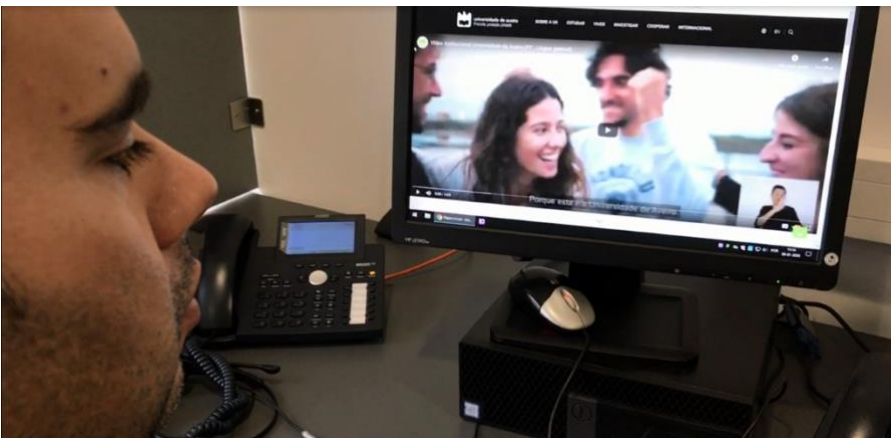


Figure 51 Blind user accesses the desktop video and describes what he saw in the scenes

The video recording about the blind (with their consent) was shared with the entire development team and the stakeholders representing the institutional agents (Figure 52). Of course, everyone felt touched when they saw the reaction of the blind users.



Figure 52 In the photo, institutional agents and development teams share the learning about Empathy Flow's approach to adapting the institutional video to meet the Accessibility requirements

This focus on accessibility had repercussions also on the news⁹. As a researcher and observer-participant of this whole process, we see that each step of this flow was necessary for this result. Self-regulation, for example, highlighted the responsibility in defense of a quality digital product. The bottom-up approach demonstrated the value of empathy and sharing the feedback with the team and with the institutional agents had a powerful effect (Lipovetsky,1998). Many feedbacks and results of UX evaluations can remain hidden. However, when feedback is sharing with the team and stakeholders,

⁹ <https://www.ua.pt/pt/noticias/11/62265>

they understand that all the effort involved was worth it. Furthermore, more than that, the success model is scalable at other points in development.

The evidence of this is that nine months after this example was experienced by the team on sprint 23, another accessible video got published in the portal's highlights area without having to repeat all that effort (Figure 53).

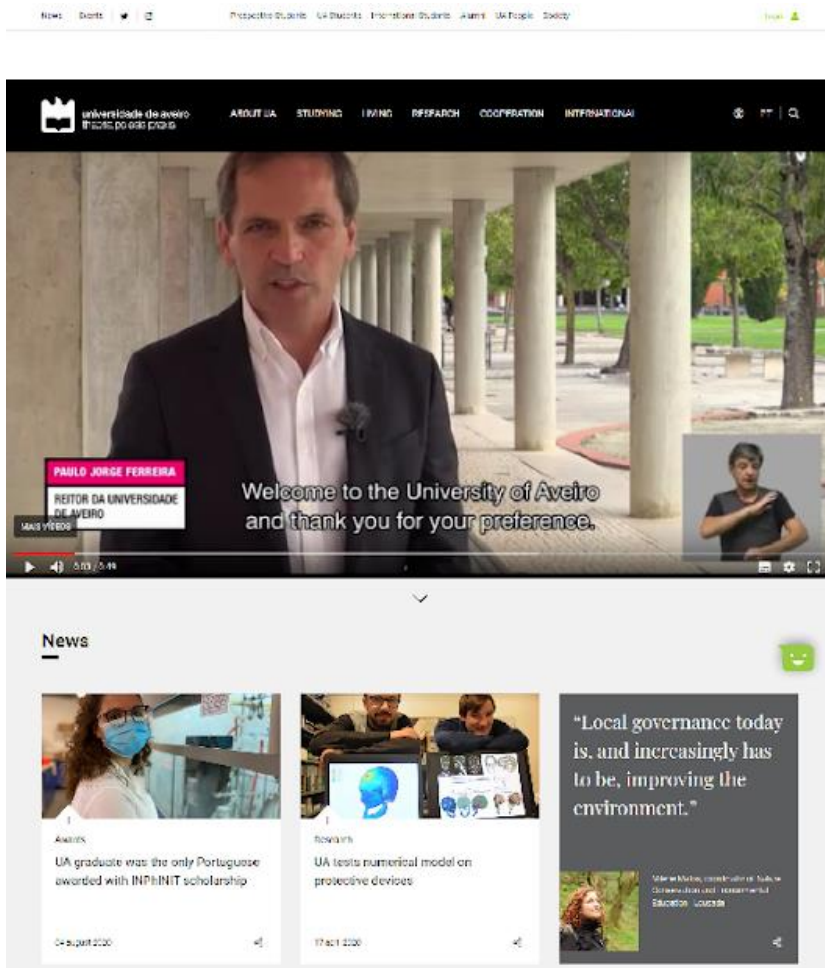


Figure 53 A new video with accessibility parameters was published in October 2020, two months after the project's end, to build the new UA portal.¹⁰

¹⁰ <https://www.youtube.com/watch?v=ozQY9vYqilg&feature=youtu.be>

We believe that when this cycle is closed, the development of the digital product became strengthened in order to make the iterations more consistent in supporting the requirements and consequently makes the product less and less vulnerable to problems of accessibility, design, interaction, and other aspects that are directly linked to a functioning that corresponds to the wishes, interests, and needs of people. From an institutional point of view, this approach can strengthen stakeholder involvement and increase the co-design process's sense of belonging.

Chapter 6 - Conclusion

Studies in the Human-Computer Interaction field only confirm that this science, that originated in engineering schools, is relevant for understanding the paradigms inherent to the constant search for user-centered design (Nielsen, 1993; Krug, 2014; Levy, 2015; Lazar et al., 2017).

The various UXR approaches (Martin & Hanington, 2012; Levy, 2015; Lazar et al., 2017) allow us to perceive the interests, desires, and needs of the user and respect the uniqueness of each one. UXR methods are also strategic tools for observing patterns and behaviors from the user's real-world and perceiving the context surrounding a person. Responding to these patterns in pleasant and useful interfaces motivates professionals and researchers in the information technology industry to continue researching. Every day, people relate to the world in a hybrid way, where the media, as digital interfaces, or intelligent tangible products, are seen as a human extension.

In this sense, the authors who underpinned the theoretical framework of this research allowed us to understand the context of the development of the new portal of the University of Aveiro as an interface that permeates the use of services, consumption of information, and the relationship of the institution with people inside and outside the academic community. To understand how UXR's approaches helped in the construction of the new portal, this investigation has delimited the portal's new news area as an object of study.

The main research question was to find out how each UXR source helped to support the collection of user input to develop the new news area. The null hypothesis that UXR sources contributed, in the same way, was rejected with a 95% confidence level. Thus, the alternative hypothesis (H1) assumes that the number of inputs generated by the four data collection sources differs. That is, each source had several capabilities to collect data in the UXR process. It confirms that each nature of data collection source (User Testing, Stakeholders Meetings Inputs, Extra Input Sources, and Automatic Analysis Tools) within UXR had a specific potential in generating inputs.

The User Testing and Automatic Analysis Tools sources were the ones that generated the most data collection for the development of the new interface, with 131 and 145

inputs, respectively. Next were the Extra Input Sources, 63 inputs, and the Stakeholders Meetings source with 32 valid inputs.

Knowing that each source of UXR contributed to the data collection differently in the number of inputs was not enough for us. That is why we sought to advance the investigation with three more hypotheses related to secondary objectives.

The first was to check the number of inputs collected by the four UXR sources that helped develop product solutions (output). The source that helped the most in the product solution (output) process was User Testing, with 78 inputs. In second place was the Extra Input Sources source, with 19 useful data collected for the output phase. The third is the Automatic Analysis Tools source, with 15 inputs. In the fourth was the Stakeholders Meetings source, with 12 inputs.

When looking at the types of the solution developed from the collected inputs, 55% of the valid cases represent adjustments made to the interface. 22% of the valid cases were corrections performed. In 19,5%, the solution was to do nothing (NONE). Moreover, 3% of the solutions developed in response to the collected inputs were new functionalities created.

This study's second secondary hypothesis was to understand which development requirements (Accessibility, Design, Political, and Institutional) UXR sources most helped to support them. The null hypothesis (the support was equal) was rejected with 95% confidence. Valid cases in which the inputs denote some constraints were considered. Therefore, when it comes to Requirements defense, it can be stated that the chosen UXR fonts helped to support Design Requirements first (with 91 valid inputs), Accessibility second (with 85 valid inputs), Political-institutional third (with 15 valid inputs), and Technical requirements fourth (with three valid inputs). Therefore, it was notorious that the Design and Accessibility requirements were the most supported throughout the development process.

Looking deeper into what each UXR font helped support most in terms of requirements support, we could see that the User Testing source requirements helped support most was Accessibility (with 64% of valid cases) and Design (with 35% of valid cases). The Extra Input Source mostly supported the Design requirements (with 84% of the valid

cases). The UXR Automatic Analysis Tools font supported the Design requirements, with 100% of the valid cases). Finally, the Stakeholders Meetings font supported the Political (with 68.8% of the valid cases) and Design (with 31% of the valid cases) requirements.

The third and last secondary hypothesis was to verify what types of problems related to the interface dimension that each UXR font helped to identify. The null hypothesis considered that the UXR sources identified the same problems and had rejected with a 95% confidence level. By considering the valid cases in percentage, the User testing source identified 45.8% of problems related to interaction, 29% of visual dimension, 19.1% of information architecture, 4.6% of bugs, and 0.8% of social presence problems. Of the data collected by the source Extra Input, 38% were of the visual dimension, 27% of social presence, 23.8% of interaction problems. 6.3% of Information Architecture, 3.2 of Bugs, and 1.6% of Use Experience. The source of UXR Automatic Analysis Tools contributed to identifying 84.1% of inputs related to Social Presence, 11.6% of Bugs, 2.9% of problems related to Information Architecture, and 0.7% of the Interaction and Visual dimensions. Finally, in the source Stakeholders Meetings, 53% of the inputs collected revealed problems in the dimension of User Experience, 16.7% of the Information and Visual Architecture dimensions, and 13.3% on Social Presence.

To specify the typologies of the inputs, we use Sousa's classification (2017). Originated as a result of a study of e-health application interfaces, the application of this classification in the news area evaluation of the new UA Portal indicates that Sousa (2017) contribution can be scalable for the evaluation of several types of interfaces and were relevant for the classification of input typologies collected in the UXR process of the UA Portal.

We hope that, with these results, it will be possible to identify the best UXR strategy to better serve the process of input collection, requirements support, identification of interface size problem typologies, and generation of solutions.

To investigate all the hypotheses of this research, we use a Bottom-up approach research methodology (Sousa, 2017) as a basis for observation and data collection. Thus, we started by observing the User Testing research results carried out by the UA portal between Sprints 11 and 23, which comprised the months of July 2019 to January 2020.

As an observer-participant researcher of the new UA portal project, we had the opportunity to collaborate with the project as a member of the Evaluation team.

Based on the Input, Requirements, and Solutions axes, the analysis model allowed us to look at the research object from a general perspective of the development cycle of a product in an Agile context. On the one hand, the model did not allow a more in-depth analysis of the data obtained due to the heterogeneity of the indicators adopted in each axis evaluated. However, on the other hand, this possibility of having an overview of the evaluation process of a digital product in an Agile environment enabled the perception of evaluation processes and the importance of the possible contributions to be obtained by each UXR strategy either in data collection, requirements support, for the identification of interface problem typologies and solution measurement.

The results obtained in this research were also relevant to understanding the complexity of the UXR process and the importance of these approaches for the involvement of the most different stakeholders linked to the digital product, as a strategy (Levy, 2015). The multidisciplinary of the development team and the transversality in involving stakeholders in constructing a product reinforce the ideas defended by Pellicciari, Peruzzini & Grandi (2017) about the model of institutions that use these approaches for the empathy process. In the UA portal, the University has itself obtained the resources to develop and evaluate the digital product, the institution being the self-regulator of development requirements (Lipovetsky, 1998). Listening and understanding users' needs are ways to meet and respect each individual (Norman, 1998) and promote increasingly inclusive access.

By evaluating the development cycle of the new News area and having the University of Aveiro as a research environment, the analysis model allowed us to generate a proposal of UX Research flow directed to the development of digital interfaces in European higher education institutions, called The Empathy Flow (Figure 50). We believe that this is also one of the contributions of this research, and we suggest that it be applied and researched in future academic studies to understand if the proposed flow can be scalable in other contexts or new phases of development of the University of Aveiro portal.

We believe that when this cycle is closed, the development of the digital product could be strengthened in order to make the iterations more consistent in supporting the requirements and consequently making the product less and less vulnerable to problems of accessibility, design, interaction, and other aspects that are directly linked to a functioning that corresponds to the wishes, interests, and needs of people (Nielsen, 1993; Dix, 2004; Krug, 2014). According to Pellicciari, Peruzzini & Grandi (2017), it is also believed that, from an institutional point of view, that this approach can strengthen stakeholder involvement and increase the sense of belonging provided by the co-design process.

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Appendix

1. UXR Sources Grid Analysis

1.1 User Testing Grid Analysis

		USER TESTING					INTERFACE		
		INPUT					EMBARASSMENT	Output	
Sample	date	SPRINT	OCC	PROBLEM/FACT	INDICATOR	TPOLOGY	REQUIREMENTS	PRODUCT/SOLUTION	
Students and UA staff	11/9/2019	13	4	Dificuldade de voltar ao topo da página (reclamou do scroll) / Cansativo! Poderia haver um botão para ajudar a voltar ao início (go to top button) / Tinha que haver uma outra opção. Se calhar eu chego aqui e desisto! / É preciso ter olhos de água. Eu ia ali beber um café!	UT5	INT	DESIGN	PS3	
Students and UA staff	11/9/2019	13	1	Desistiu de aceder ao portal de notícias	UT2	VIS	DESIGN	PS1	
Students and UA staff	11/9/2019	13	1	Desistiu de voltar à home do portal de notícias	UT2	ARQINF	DESIGN	PS1	
Students and UA staff	11/9/2019	13	1	Desistiu de aceder mais notícias	UT2	VIS	DESIGN	NONE	
Students and UA staff	11/9/2019	13	1	Desistiu de aceder ao menu de categorias	UT2	VIS	DESIGN	PS1	
Students and UA staff	11/9/2019	13	1	Não percebeu o botão ver mais	UT2	VIS	DESIGN	NONE	
Students and UA staff	11/9/2019	13	1	Tinha dúvida de que a imagem fosse link (sem atribuição de link)	UT7	INT	DESIGN	PS1	
Students and UA staff	11/9/2019	13	1	Demasiado esforço para destor clicar no título (mobile)	UT5	INT	DESIGN	NONE	
Students and UA staff	11/9/2019	13	1	Dificuldade de voltar à home do jornal	UT5	VIS	DESIGN	PS1	
Students and UA staff	11/9/2019	13	1	Efeito de dropdown indesejado no link notícias (mobile)	UT5	INT	DESIGN	PS2	
Students and UA staff	11/9/2019	13	1	Dificuldade de interação com os ícones de partilha	UT5	INT	DESIGN	PS1	
Students and UA staff	11/9/2019	13	6	Não interagiram com o botão slide no destaque	UT2	INT	DESIGN	NONE	
Students and UA staff	11/9/2019	13	3	Tentaram aceder ao portal de notícias no menu SobreUA	UT11	VIS	DESIGN	PS1	
Students and UA staff	11/9/2019	13	1	Botão + sem link a funcionar (Home UA)	UT5	PSOC	POLITICAL	NONE	
Students and UA staff	11/9/2019	13	10	Clicou mais de 6 vezes ou mais (9) para conseguir abrir o menu (mobile)	UT5	VIS	DESIGN	PS1	
Students and UA staff	11/9/2019	13	4	Demorou mais de 10" (30") para conseguir clicar no botão "ver mais"	UT5	INT	DESIGN	PS1	
Students and UA staff	11/9/2019	13	2	Os botões de partilha estão muito próximos	UT10	INT	DESIGN	PS1	
Students and UA staff	11/9/2019	13	2	Deixar os botões de partilha um pouco mais centralizados	UT9	INT	DESIGN	PS2	
Students and UA staff	11/9/2019	13	4	Na leitura das notícias abaixo dos destaques, não há necessidade do Alt da data como um link ("Visitado link 25 de novembro de 2019", é desnecessário) Isso faria sentido se direcionasse para as notícias daquele dia ou para uma agenda. A sugestão é ler sem o efeito de link.	UT5	INT	DESIGN	PS1	
Students and UA staff	11/9/2019	13	1	A ausência de Alt nas notícias, bem como descrições não tão claras, foi um ponto criticado pelas peritas	UT6	INT	DESIGN	NONE	
Accessibility expert	25/11/2019	18	3	O uso de abreviações sem explicação também foi criticado como aspeto que dificulta a compreensão do conteúdo.	UT6	ARQINF	ACCESSIBILITY	NONE	
Accessibility expert	25/11/2019	18	3	No destaque do jornal, o botão de partilha não poderia ser descrito depois da imagem?	UT5	VIS	ACCESSIBILITY	PS1	
Accessibility expert	25/11/2019	18	3	Com a descrição de tantos elementos na área de destaques, o caminho para voltar até a primeira notícia não ficaria demasiado longo?	UT5	ARQINF	ACCESSIBILITY	PS1	
Accessibility expert	25/11/2019	18	3	Seria interessante um Alt indicando "fim dos destaques"	UT6	ARQINF	ACCESSIBILITY	PS1	
Accessibility expert	25/11/2019	18	3	Não faz sentido ter os botões de partilha de redes sociais entre o título da notícia e o texto. Se já há no fim do texto, não é necessário ter antes.	UT5	ARQINF	ACCESSIBILITY		
Accessibility expert	25/11/2019	18	3	O Alt diz: "distinções link" mas não diz o que é. Poderia mudar o copy para "categoria distinções" ou algo semelhante. Não fica intuitivo, principalmente para o público de fora da UA, na opinião das peritas	UT6	VIS	ACCESSIBILITY	-	
Accessibility expert	25/11/2019	18	3	As teclas de atalho funcionaram perfeitamente durante a navegação para voltar à página principal	UT5	ARQINF	ACCESSIBILITY	PS1	
Accessibility expert	25/11/2019	18	3	Foi possível navegar sem o uso do rato pelas tags das notícias e no menu de categorias	UT5	VIS	ACCESSIBILITY	NONE	
Accessibility expert	25/11/2019	18	3	O utilizador navega tranquilamente pelas categorias do menu superior. Mas depois de escolher uma, em vez de saltar aos resultados, quando a página é carregada o Tab volta a percorrer toda a lista de links do menu categorias, para só depois ler as notícias presentes naquela categoria.	UT4	INT	ACCESSIBILITY	-	
Accessibility expert	25/11/2019	18	3	No passo seguinte, quando a notícia é escolhida, o mesmo não ocorre, ou seja, o utilizador consegue ir direto ao conteúdo da notícia.	UT4	INT	ACCESSIBILITY	-	

Accessibility expert	25/11/2019	18	3	Os títulos das categorias "Opinião" e "Entrevistas" (já estando numa dessas páginas), por exemplo, não são lidos para situar o utilizador.	UT5	INT	ACCESSIBILITY	-
Accessibility expert	25/11/2019	18	3	Ao ler uma notícia com evento associado, a sequencia do Tab deixa de ler o texto e salta para a coluna esquerda, onde está a informação do "evento associado". Ou seja, perde-se a sequencia de leitura do texto.	UT4	INT	ACCESSIBILITY	-
Accessibility expert	25/11/2019	18	3	Ao final do texto é possível partilhar a noticia.	UT5	BUG	ACCESSIBILITY	PS1
Accessibility expert	25/11/2019	18	3	O Alt das imagens das notícias precisa de uma descrição melhor e mais contextualizada.	UT5	ARQINF	ACCESSIBILITY	PS1
Accessibility expert	25/11/2019	18	3	Não faz sentido ter os botões de partilha de redes sociais entre o título da notícia e o texto. Se já há no fim do texto, não é necessário ter antes.	UT4	INT	ACCESSIBILITY	-
Accessibility expert	25/11/2019	18	3	O Alt diz: "distinções link" mas não diz o que é. Poderia mudar o copy para "categoria distinções" ou algo semelhante. Não fica intuitivo, principalmente para o público de fora da UA, na opinião das peritas	UT5	VIS	ACCESSIBILITY	PS1
Blind	24/01/2020	21	3	Uso de abreviaturas nos textos das notícias precisa de um cuidado maior, pois para o público de fora da UA fica difícil compreender.	UT5	ARQINF	ACCESSIBILITY	PS1
Blind	24/01/2020	21	3	As teclas de atalho funcionaram perfeitamente durante a navegação para voltar à página principal	UT5	VIS	ACCESSIBILITY	NONE
Blind	24/01/2020	21	3	Foi possível navegar sem o uso do rato pelas tags das notícias e no menu de categorias	UT5	ARQINF	ACCESSIBILITY	PS2
Blind	24/01/2020	21	3	O utilizador navega tranquilamente pelas categorias do menu superior. Mas depois de escolher uma, em vez de saltar aos resultados, quando a página é carregada o Tab volta a percorrer toda a lista de links do menu categorias, para só depois ler as notícias presentes naquela categoria.	UT4	INT	ACCESSIBILITY	-
Blind	24/01/2020	21	3	No passo seguinte, quando a notícia é escolhida, o mesmo não ocorre, ou seja, o utilizador consegue ir direto ao conteúdo da notícia.	UT4	INT	ACCESSIBILITY	-
Blind	24/01/2020	21	3	Os títulos das categorias "Opinião" e "Entrevistas" (já estando numa dessas páginas), por exemplo, não são lidos para situar o utilizador, ficam invisíveis	UT5	INT	ACCESSIBILITY	PS2
Blind	24/01/2020	21	3	Ao ler uma notícia com evento associado, a sequencia do Tab deixa de ler o texto e salta para a coluna esquerda, onde está a informação do "evento associado". Ou seja, perde-se a sequencia de leitura do texto.	UT4	INT	ACCESSIBILITY	-
Blind	24/01/2020	21	3	Ao final do texto é possível partilhar a noticia.	UT5	VIS	ACCESSIBILITY	PS1
Blind	24/01/2020	21	3	Em algumas notícias a tecla de atalho salta para o footer em vez de ler o texto. (bug)	UT5	INT	ACCESSIBILITY	PS1
Blind	24/01/2020	21	3	O Alt das imagens das notícias precisa de uma descrição melhor e mais contextualizada.	UT4	INT	ACCESSIBILITY	-
Blind	24/01/2020	21	3	Salta direto ao final	UT5	BUG	ACCESSIBILITY	PS2
Blind	24/01/2020	21	3		UT5	VIS	ACCESSIBILITY	PS1
Compliment	UT4							
Complaint	UT5							
Adjustments	PS1							
Corrections	PS2							
- New features	PS3							

1.2 Automatic Analysis Tool Grid Analysis

AUTOMATIC ANALYSIS TOOLS						INTERFACE		
INPUT							EMBARRASSMENT?	OUTPUT
SPRINT	N	ID	SCORE	PROBLEM/FACT	INDICATOR	TYPOLGY B	REQUIREMENTS	PRODUCT/SOLUTION
15	1	#1397	5	-	AT3	PSOC	-	-
15	2	#1403	5	-	AT3	PSOC	-	-
15	3	#1404	5	-	AT3	PSOC	-	-
15	4	#1405	5	-	AT3	PSOC	-	-
15	5	#1411	4	" Título de notícia aparece cortado na horizontal quando são 3 linhas. E há um hug nos quadradinhos que assinalam a posição do User perante o carrossel de notícias. "	AT2	BUG	-	PS2
15	6	#1414	5	Muito boa!	AT3	PSOC	-	-
15	7	#1423	4	-	AT3	PSOC	-	-
15	8	#1434	5	Gostamos muito destas notícias que nos deixam muito orgulhosos.	AT3	PSOC	-	-
15	9	#1436	4	Muito intetessante	AT3	PSOC	-	-
15	10	#1437	5	-	AT3	-	-	-
15	11	#1439	4	-	AT3	PSOC	-	-
15	12	#1442	4	-	AT3	PSOC	-	-
15	13	#1444	4	-	AT3	PSOC	-	-
15	14	#1453	5	-	AT3	PSOC	-	-
15	15	#1457	5	-	AT3	PSOC	-	-
15	16	#1466	2	Não tô conseguindo entender,tinha que estar mais explicado onde fica a questão das bolsas, cursos...	AT2	ARQINF	-	NONE
15	17	#1467	3	-	AT2	-	-	-
15	18	#1472	1	-	AT2	PSOC	-	-
16	1	#1481	4	-	AT3	PSOC	-	-
16	2	#1493	4	-	AT3	PSOC	-	-
16	3	#1498	4	-	AT3	PSOC	-	-
16	4	#1501	4	" Sem dúvida, atividade física é fundamental para todos, novos e idosos. Aulas de zumba, Gold. "	AT3	PSOC	-	-
16	5	#1504	4	" Very interesting,,I hope you find a solution "	AT3	PSOC	-	-
16	6	#1517	4	" É difícil passar as notícias para PDF ou mesmo fazer um print screen da notícia pois sendo muito estreita a página a notícia acaba por ficar muito comprida. "	AT2	INT	-	-
16	7	#1521	4	-	AT3	PSOC	-	-
16	8	#1523	3	-	AT2	PSOC	-	-
16	9	#1524	5	-	AT3	PSOC	-	-
16	10	#1530	2	-	AT2	PSOC	-	-
16	11	#1535	4	-	AT3	PSOC	-	-
16	12	#1536	4	-	AT3	PSOC	-	-
16	13	#1543	5	-	AT3	PSOC	-	-
16	14	#1548	2	" Tenho dificuldade em encontrar o que procuro "	AT2	ARQINF	-	-
16	15	#1552	4	-	AT3	PSOC	-	-
16	16	#1554	4	-	AT3	PSOC	-	-
17	1	#1558	5	-	AT3	PSOC	-	-
17	2	#1564	1	-	AT2	-	-	-
17	3	#1565	3	-	AT2	-	-	-
17	4	#1567	4	-	AT3	PSOC	-	-
17	5	#1570	4	-	AT3	PSOC	-	-
17	6	#1587	4	-	AT3	PSOC	-	-
17	7	#1589	5	-	AT3	PSOC	-	-

17	8	#1595	2	-	AT2	BUG	-	PS2
17	9	#1596	5	" Portal muito bom "	AT3	PSOC	-	-
17	10	#1598	3	-	AT2	-	-	-
17	11	#1600	4	-	AT3	-	-	-
17	12	#1601	2	" Estou a tentar aceder à página e nada.. "	AT2	BUG	-	PS2
17	13	#1602	5	" Olá "	AT3	PSOC	-	-
17	14	#1603	3	-	AT2	BUG	-	PS2
17	15	#1606	2	-	AT2	BUG	-	PS2
17	16	#1610	4	-	AT3	-	-	-
17	17	#1615	1	" pagina em branco não se consegue aceder a nenhuma página "	AT2	BUG	-	PS2
17	18	#1617	1	-	AT2	BUG	-	PS2
17	19	#1621	5	-	AT3	PSOC	-	-
17	20	#1627	5	" Me ajudou no projeto "	AT3	PSOC	-	-
17	21	#1628	1	" Ma "	AT2	PSOC	-	-
17	22	#1633	4	-	AT3	PSOC	-	-
18	1	#1637	5	-	AT3	PSOC	-	-
18	2	#1638	4	-	AT3	PSOC	-	-
18	3	#1642	4	" Não sei opinar, pois acabo de entrar. "	AT3	PSOC	-	-
18	4	#1645	1	-	AT2	BUG	-	PS2
18	5	#1647	5	-	AT3	PSOC	-	-
18	6	#1649	1	-	AT2	BUG	-	PS2
18	7	#1650	4	-	AT3	PSOC	-	-
18	8	#1651	4	-	AT3	PSOC	-	-
18	9	#1652	5	-	AT3	PSOC	-	-
18	10	#1654	4	-	AT3	PSOC	-	-
18	11	#1657	5	-	AT3	PSOC	-	-
18	12	#1658	5	-	AT3	PSOC	-	-
18	13	#1666	5	-	AT3	PSOC	-	-
18	14	#1670	4	-	AT3	PSOC	-	-
18	15	#1671	4	-	AT3	PSOC	-	-
18	16	#1672	4	" Muito melhor agora que é adaptado para mobile "	AT3	VIS	-	-
18	17	#1673	5	" Site em organizado, com a informação explícita. Além disso, é estritamente agradável. "	AT3	PSOC	-	-
18	18	#1674	5	-	AT3	PSOC	-	-
18	19	#1680	4	-	AT3	PSOC	-	-
18	20	#1692	5	" Diogo. Marques "	AT3	PSOC	-	-
18	21	#1698	5	-	AT3	PSOC	-	-
19	1	#1711	2	-	AT2	PSOC	-	-
19	2	#1716	4	-	AT3	PSOC	-	-
19	3	#1718	5	-	AT3	PSOC	-	-
19	4	#1719	3	" Lamento que seja escrito em acordês e não no português da norma de 1945 que é a que, legalmente, está em vigor, embora andem todos a fingir que o AO/90 é obrigatório. "	AT2	PSOC	-	-
19	5	#1720	5	" Parabens! "	AT3	PSOC	-	-
19	6	#1728	5	" Gostei do bom aspeto "	AT3	PSOC	-	-
19	7	#1736	4	-	AT3	PSOC	-	-
19	8	#1741	4	-	AT3	PSOC	-	-
19	9	#1754	4	-	AT3	PSOC	-	-
19	10	#1759	2	-	AT2	BUG	-	PS2
19	11	#1760	2	-	AT2	BUG	-	PS2
19	12	#1761	5	" Muito bom. "	AT3	PSOC	-	-
19	13	#1762	4	-	AT3	PSOC	-	-

19	14	#1763	1	-	AT2	BUG	-	PS2
19	15	#1767	5	" Obrigada ☐ "	AT3	PSOC	-	-
19	16	#1768	1	" Na versão mobile o botão my UA no canto superior direito da página não apaga o url atual antes de fazer o redirect "	AT2	BUG	-	PS2
20	1	#1781	1	" Bonito, mas difícil encontrar a informação ou com endereçamento errado "	AT2	ARQINF	-	NONE
20	2	#1800	4	-	AT3	PSOC	-	-
20	3	#1802	4	-	AT3	PSOC	-	-
20	4	#1804	4	-	AT3	PSOC	-	-
20	5	#1805	3	-	AT2	BUG	-	-
20	6	#1822	5	-	AT3	PSOC	-	-
20	7	#1825	5	" Como eu me possa candidatar na licenciatura "	AT3	PSOC	-	-
20	8	#1826	5	-	AT3	PSOC	-	-
20	9	#1834	4	-	AT3	PSOC	-	-
20	10	#1841	5	-	AT3	PSOC	-	-
20	11	#1843	3	-	AT2	PSOC	-	-
20	12	#1853	3	-	AT2	BUG	-	PS2
20	13	#1860	4	-	AT3	PSOC	-	-
20	14	#1861	2	-	AT2	PSOC	-	-
20	15	#1868	2	-	AT2	PSOC	-	-
20	16	#1873	4	-	AT3	PSOC	-	-
20	17	#1882	4	-	AT3	PSOC	-	-
20	18	#1883	5	-	AT3	PSOC	-	-
20	19	#1885	4	-	AT3	PSOC	-	-
20	20	#1888	5	-	AT3	PSOC	-	-
20	21	#1889	5	-	AT3	PSOC	-	-
20	22	#1891	4	-	AT3	PSOC	-	-
20	23	#1901	5	-	AT3	PSOC	-	-
20	24	#1908	3	-	AT2	PSOC	-	-
21	1	#1916	5	-	AT3	PSOC	-	-
21	2	#1917	5	-	AT3	PSOC	-	-
21	3	#1918	2	-	AT3	PSOC	-	-
21	4	#1959	1	" procuro mais informação em detale do mestrado e não consigo encontrar. Depois de várias tentativas, e por um mero acaso, desloquei a página para baixo e no fundo da página encontrei alguma informação que procurava. Está realmente péssima a forma como colocam a informação. Deveria existir um "Ver mais" para dar informação que existe mais dados a serem visualizados. Em minha opinião, esta forma de se organizar a informação está muito pior do que o layout anterior!!! "	AT2	ARQINF	-	-
21	5	#1983	4	-	AT3	PSOC	-	-
21	6	#1988	4	-	AT3	PSOC	-	-
21	7	#1989	5	-	AT3	PSOC	-	-
21	8	#1994	5	-	AT3	PSOC	-	-
21	9	#1998	3	-	AT2	PSOC	-	-
21	10	#2001	4	-	AT3	PSOC	-	-
21	11	#2009	3	-	AT2	PSOC	-	-
22	1	#2031	4	-	AT3	PSOC	-	-
22	2	#2040	3	-	AT2	PSOC	-	-
22	3	#2041	5	-	AT3	PSOC	-	-
22	4	#2078	5	-	AT3	PSOC	-	-
22	5	#2093	5	-	AT3	PSOC	-	-

22	6	#2096	5	" !!! "	AT3	PSOC	-	-
22	7	#2104	5	-	AT3	PSOC	-	-
22	8	#2106	3	-	AT2	BUG	-	PS2
23	1	#2111	4	-	AT3	PSOC	-	-
23	2	#2121	4	-	AT3	PSOC	-	-
23	3	#2127	5	-	AT3	PSOC	-	-
23	4	#2133	5	-	AT3	PSOC	-	-
23	5	#2135	5	-	AT3	PSOC	-	-
23	6	#2138	3	-	AT2	PSOC	-	-
23	7	#2147	5	" Olá. Venho desde já agradecer-vos terem ajudado a resgatar do mar as focas e é esse motivo que me leva a contactar-vos tem o contacto do departamento que gere os custos para a sua alimentação? Sou Teresa Cardoso e gostaria de ajudar eu e meus colegas. meu email: tetebaba@hotmail.com Atentamente "	AT3	PSOC	-	-
23	8	#2149	5	-	AT3	PSOC	-	-
total	144							
Complaint			AT2					
Compliment			AT3					
Adjusment			PS1					
Corrections			PS2					
New Features			PS3					

1.3 Stakeholders Meetings Grid Analysis

		STAKEHOLDERS MEETINGS					INTERFACE			
		INPUT					EMBARASSMENT?			
Sample	date	SPRINT	Occ	PROBLEM/FACT	INDICATOR	TPOLOGY	REQUIREMENTS	PRODUCT/SOLUTION		
Agent	25/9/2019	13	1	Descatar de alguma forma o título "Notícias"	SM3	INT	DESIGN	PS1		
Agent	25/9/2019	13	1	Salientar o título "Notícias" atribuindo-lhe uma cor	SM3	INT	DESIGN	PS1		
Agent	25/9/2019	13	1	Passar o menu de categorias para a lateral esquerda	SM3	INT	POLITICAL	NONE		
				Reduzir o tamanho da imagem do destaque. Tenho estado a seguir a troca de emails com os SCIRP e considero que devemos olhar com atenção para a questão que estão a colocar sobre a obrigatoriedade de um tamanho mínimo tão elevado para as fotografias das notícias. Uma solução que me lembrei passava pela possibilidade de introduzir notícias que não tivessem a possibilidade de ser promovidas a destaque. Essas notícias ficavam automaticamente limitadas caso a imagem não tivesse as dimensões necessárias. O editor seria avisado no momento da edição.						
Agent	25/9/2019	13	1	Faz sentido?	SM3	INT	DESIGN	PS1		
Agent	25/9/2019	13	1	Reduzir os espaçamentos para que o ecrã mostre mais conteúdos	SM3	ARQINF	DESIGN	PS1		
Agent	26/9/2019	14	1	Reorganizar o menu de categorias	SM3	VIS	POLITICAL	PS1		
Agent	26/9/2019	14	1	Inserir Entrevistas e Opinião no campo de categorias	SM3	INT	POLITICAL	PS1		
Pivot	10/10/2019	15	1	Jornal mais moderno e com aposta forte nas imagens.	SM1	PSOC	-	-		
Pivot	10/10/2019	15	1	Queremos pedir a vossa colaboração (dos pivots) pra manter o jornal mais atualizado	SM4	-	POLITICAL	-		
Pivot	10/10/2019	15	1	Precisamos de boa fotografia	SM4	-	POLITICAL	-		
Pivot	10/10/2019	15	1	Precisamos de transmitir uma boa imagem. Vamos lutar muito por isso. É um cuidado que devemos ter e vamos ajudar vocês (pivots).	SM4	VIS	POLITICAL	-		
Pivot	10/10/2019	15	1	Nossa ideia foi deixar claro que existe uma separação entre portal e jornal.	-	PSOC	-	-		
Pivot	10/10/2019	15	1	Meu elogio ao portal e ao novo jornal, que manteve a mesma identidade (do portal)	SM1	VIS	-	-		
Pivot	10/10/2019	15	1	É necessário destacar mais a agenda	SM4	VIS	-	-		
Pivot	10/10/2019	15	1	Recebemos muitas chamadas de pessoas que nos pedem ajuda para encontrar informação de concursos.	SM2	INT	DESIGN	NONE		
Pivot	10/10/2019	15	1	Uma das sugestões que temos é o utilizador fazer login e personalizar as categorias de notícias do seu interesse. (MyUA)	SM3	INT	POLITICAL	-		
Pivot	10/10/2019	15	1	Futuramente as notícias criadas e geridas pelos departamentos podem virar um problema, pois as fotos precisam ter direitos autorais.	SM4	PSOC	POLITICAL	-		
Pivot	10/10/2019	15	1	Minha sugestão é criarmos uma cultura de lembrar aos professores para enviarem fotos dos eventos, indicando a permissão de direitos.	SM3	PSOC	POLITICAL	-		
Pivot	10/10/2019	15	1	Nós, pivots não somos jornalistas, somos fonte de informação para vocês.	SM2	PSOC	POLITICAL	-		
Pivot	10/10/2019	15	1	Por qual motivo não se cria um evento na agenda sem associar às notícias?	SM2	ARQINF	POLITICAL	-		
Blind 1	9/1/2020	20	1	enquanto ela está agora a falar está-se a ver essas... o que ela estava a dizer. A vista aérea do campus... do jogo de hugby. Ect, etc, é isso?	SM1	VIS	-	-		
Blind 1	9/1/2020	20	1	Epá. Isso até comove, fogo! Podes crer!! Tá muito fixe! (com mãos no rosto a chorar)	SM1	UX	-	-		
Blind 1	9/1/2020	20	1	Podes crer! (a chorar, cliente levanta-se e abraça o pesquisador)	SM1	UX	-	-		
Blind 1	9/1/2020	20	1	Epá, em primeiro lugar transmitiu para mim uma maneira de ver a universidade, a nova versão da preocupação que a universidade tem em ser inclusiva	SM1	PSOC	-	-		
Blind 1	9/1/2020	20	1	transmitiu a mim pessoalmente uma grande emoção.	SM1	UX	-	-		
Blind 1	9/1/2020	20	1	não é muito normal, não é muito habitual as instituições preocuparem-se assim com a integração e com a inclusão. As pessoas vivem mais para o que é quantidade e não para aquilo que é qualidade. E, neste caso, a universidade revelou que tem uma grande capacidade para a qualidade e não para a quantidade.	SM1	PSOC	-	-		

Blind 1	9/1/2020	20	1	Nós é que sentimos quais são as nossas necessidades. Muitas das vezes os projectistas, inclusivamente os projectistas da acessibilidades e etc, etc... quando dizem "Ah, vamos fazer assim", mas aquilo que eles acham no gabinete, o que eles acham no computador não é aquilo que nós achamos na prática. Então lá está, quando nós andamos no balanço das ondas do mar é que enjoamos com o balanço da coisa. Estás a perceber?	SM1	UX	-	-
Blind 1	9/1/2020	20	1	Vocês fizeram o trabalho a começar pelos alicerces, não foi a começar pelo telhado, como muita gente que quer fazer trabalho para a inclusão mas sabem fazer porque começam pelo telhado. Isto por que? Porque não consultam as pessoas que têm a sensação correta, a sensação exacta, a real. Vocês têm uma sensação parcial, imaginam que deve ser assim. Muitas das vezes não é aquilo que vocês imaginam.	SM1	PSOC	-	-
Blind 1	9/1/2020	20	1	Portando aqui neste caso vocês disseram, epá, nós vamos fazer assim. O que é que vocês acham. O André Calisto antes disto ir para ar, uma vez ligou-me e disse: "Epá, olha lá"... mas não me disse que era ele que estava a fazer isso. Disse: "Epá nós estamos a fazer o trabalho do vídeo, e tal, não sei o que... como é que vocês veem a audio descrição?" E eu: "Epá, audiodescrição... enquanto está a passar a imagem alguém tem que estar num voz off por trás a dizer o que é que está a passar. (André disse:) "Epá, e o que é que tu achas disto assim e assim? Enquanto uma miúda anda de bicicleta nos passadiços da ria, a dizer isto assim e assim?" E eu disse-lhe: "está ótimo" .	SM1	PSOC	-	-
Blind 2	9/1/2020	20	1	Eu vi primeiro sem a audiodescrição porque andei um pouquinho para baixo e vi o play e entrei. E eu estava a dizer ao Jorge: - "mas epá, eu estou a ver o vídeo mas não estou a ver a audiodescrição. Lá está, o que eu estava a ouvir era a música do vídeo, só que... a música é bonita e de facto foi bem escolhida, mas eu não estava a perceber o que é que se estava a passar enquanto corria a música. E assim, com esta audiodescrição eu estou a visualizar à minha maneira aquilo que está a passar na imagem.	SM1	VIS	-	-
Blind 2	9/1/2020	20	1	Deu, exactamente. Consigo ver. Pronto, estou a ver neste momento o vídeo e o que está a passar. Por exemplo, neste momento está uma investigadora a observar ao microscópio, um robô que está a fazer uma venha, aparece o mapa mundo, pronto e sabemos o que é que está a passar durante a música. Os alunos que se cumprimentam... E portanto... aparece uma imagem da biblioteca... Epá, dá para percebermos aqui, dá para ficarmos enquadrados... imagens das salinas... e acaba aqui o vídeo. E noto, ouço a água, não é... e dá para percebermos que... e pronto, lá está...	SM1	VIS	-	-
Blind 2	9/1/2020	20	1	enquanto cliente sou extremamente satisfeito. Acho que foi uma aposta excelente. Não sei quem foi o mentor desta de audiodescrição, mas tu disseste que foram muitos, foram todos, mas de facto foi uma ideia extraordinária. De facto, valeu mesmo a pena.	SM1	UX	-	-
			32					
Praise		SM1						
Complaint		SM2						
Suggestion		SM3						
Need		SM4						
Adjustment		PS1						
Correction		PS2						
New Feature		PS3						

1.4 Extra Input Grid Analysis






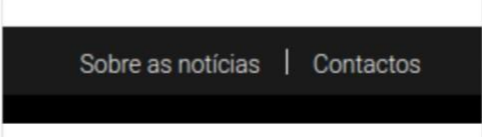
		EXTRA INPUT SOURCES					INTERFACE			
		INPUT							OUTPUT	
ID	date	SPRINT	OCC	PROBLEM/FACT	INDICATOR	TYPOLOGY	REQUIREMENTS	EMBARRASSMENT?	PRODUCT/SOLUTION	
Agent (MS Teams App)	18/9/2019	13	1	Tamanho mínimo tão elevado para as fotografias das notícias (comentário da Paula transmitido pelo professor Carlos Santos no Teams) [17/09/19 10:05] Carlos Santos Viva! Tenho estado a seguir a troca de emails com os SCIRP e considero que devemos olhar com atenção para a questão que estão a colocar sobre a obrigatoriedade de um tamanho mínimo tão elevado para as fotografias das notícias. Uma solução que me lembrei passava pela possibilidade de introduzir notícias que não tivessem a possibilidade de ser promovidas a destaque. Essas notícias ficavam automaticamente limitadas caso a imagem não tivesse as dimensões necessárias. O editor seria avisado no momento da edição. Faz sentido?	EX4	VIS	POLITICAL		PS1	
Fb Carlos Santos	16/10/2019	15	1	Novidades no Portal da UA! :) Parabéns a toda a equipa do Portal no #ualabs, jornalistas dos SCIRP, colegas dos STIC da área de servidores e todos os outros que tornaram possível mais este lançamento.	EX2	PSOC	-		-	
Fb Carlos Santos	16/10/2019	15	1	Saudades tenho dos event.ua.pt. Isso é que era. Estas coisas modernças ... E já agora, um tesourinho deprimente	EX2	PSOC	-		-	
Fb Carlos Santos	16/10/2019	15	1	Na altura era qq coisa. Sobretudo porque a homepage era esta coisa maravilhosa	EX2	PSOC	-		-	
Fb Carlos Santos	16/10/2019	15	1	e o guia online ...?	EX2	PSOC	-		-	
Fb Carlos Santos	16/10/2019	15	1	Tchiiii...já não me lembrava disto!	EX2	PSOC	-		-	
Fb Carlos Santos	16/10/2019	15	1	Este é verdadeira arqueologia pré-histórica! Do tempo em que ainda não tinha nascido o Design. Já não o viste em plena ação, Diogo Casanova. Mas eu ainda escrevi muito texto para as páginas que se acediam com o belo do botão pisca-pisca :)	EX2	PSOC	-		-	
Fb Carlos Santos	16/10/2019	15	1	Essa sim, é um pouco deprimente. Lembra-me que tenho uma certa idade	EX2	PSOC	-		-	
Fb Carlos Santos	16/10/2019	15	1	Esta última imagem podia ter ficado num disco duro caído num reservatório de ácido altamente corrosivo...	EX2	PSOC	-		-	
Fb Carlos Santos	16/10/2019	15	1	Bem de qq forma. Parabéns a toda a equipa pelo excelente trabalho	EX2	PSOC	-		-	
Fb Carlos Santos	16/10/2019	15	1	Obrigado! Tem sido uma grande aventura e um prazer enorme ter tanta gente a colaborar.	EX2	PSOC	-		-	
Fb Carlos Santos	16/10/2019	15	1	Estamos todos de parabéns!	EX2	PSOC	-		-	
Fb Carlos Santos	16/10/2019	15	1	Adoro, parabéns pelo excelente trabalho Carlos Santos, Cristina Guimarães e restante equipa!	EX2	PSOC	-		-	
Fb Carlos Santos	16/10/2019	15	1	Novidades no Portal da UA! :) Parabéns a toda a equipa do Portal no #ualabs, jornalistas dos SCIRP, colegas dos STIC da área de servidores e todos os outros que tornaram possível mais este lançamento.	EX2	PSOC	-		-	
Fb Carlos Santos	16/10/2019	15	1	Ok, não é intuitivo (link no módulo de notícias), implica literacia de navegação, mas acho que nos dias de hoje já não será tão problemática.	EX2	INT	DESIGN		NONE	
Fb Carlos Santos	16/10/2019	15	1	Sim, é melhor (slider automático nos destaques). Muitas vezes mudavam os segundos e terceiros destaques e não eram perceptíveis.	EX2	INT	-		-	
Fb Carlos Santos	16/10/2019	15	1	Já existia o "Quem sou?" como acesso aos públicos?	EX2	ARQINF	-		-	
Fb Carlos Santos	16/10/2019	15	1	Ah! Então não é por eu hoje ter usado os óculos que vejo melhor! (elogio ao aumento do tamanho da fonte do texto)	EX2	VIS	-		-	
Fb Carlos Santos	16/10/2019	15	1	(reclamação ao tamanho do texto da barra cinza) CampusResearchCulture and SportsAwardsConferencesInterviewsOpinion diria que esta bar tem um corpo de letra muito pequeno, de resto está impecável!! na bbc tb são pequenas mas acho que não são tanto. no Guardian são um pouco maiores e é mais confortável. Gosto das do público são ligeiramente maiores	EX2	VIS	DESIGN		NONE	
Fb Carlos Santos	16/10/2019	15	1	A mim tb me parece que dentro da notícia, o corpo do texto poderia ter a fonte um pouco maior..	EX2	VIS	DESIGN		PS1	
Fb Carlos Santos	16/10/2019	15	1	Até fui ver, mas o que me reparei é que as caixas abaixo das notícias, quando têm texto do lado esquerdo, este aparece parcialmente cortado, não adianta fazer scroll para a esquerda. É problema a resolver, certo?	EX2	BUG	DESIGN		PS2	


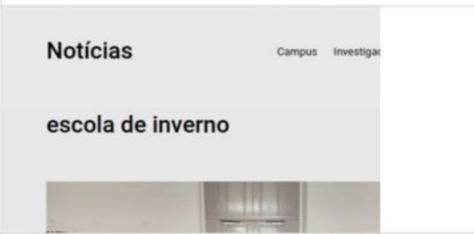
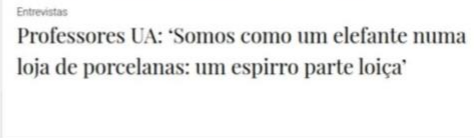


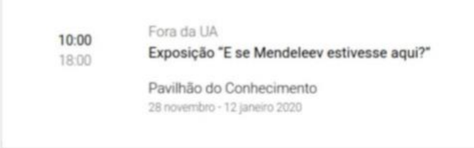

Fb Sr Reitor Paulo Jorge Ferreira	16/10/2019	15	1	Mais uma etapa para a renovação do portal da UA, um trabalho que se deve a uma grande equipa de vários serviços e departamentos, com estudantes, docentes e pessoal técnico, administrativo e de gestão. Parabéns a todos!	EX2	PSOC	-	-
Expert J. Abreu	24/02/2020	23	1	[Trivial] Padding de cima não é igual ao de baixo. Deve ser uma mistura da altura dos separadores e do line-height do texto	EX6	VIS	DESIGN	PS1
Expert J. Abreu	24/02/2020	23	1	[Trivial] A cor do botão está demasiado escura?	EX6	VIS	DESIGN	NONE
Expert J. Abreu	24/02/2020	23	1	[Minor] O layout com a imagem no canto fica um pouco estranho	EX6	VIS	DESIGN	NONE
Expert J. Abreu	24/02/2020	23	1	[Trivial] O feedback do hover ser apenas zoom na imagem não é inteiramente perceptível	EX6	INT	DESIGN	NONE
Expert J. Abreu	24/02/2020	23	1	[Trivial] A área de hover do tooltip é demasiado restrita	EX6	VIS	DESIGN	PS1
Expert J. Abreu	24/02/2020	23	1	[Trivial] O lado esquerdo do + não é clicável	EX6	VIS	DESIGN	PS1
Expert J. Abreu	24/02/2020	23	1	[Trivial] Todo este texto não é seleccionável?	EX6	INT	DESIGN	PS1
Expert J. Abreu	24/02/2020	23	1	[Minor] As setas não mudam o cursor em hover	EX6	VIS	DESIGN	PS1
Expert J. Abreu	24/02/2020	23	1	[Trivial] O estado desactivado das setas podia ser mais escuro para se destacar mais	EX6	VIS	DESIGN	NONE
Expert J. Abreu	24/02/2020	23	1	[Trivial] Porque é que aqui dá para navegar nos dias, mesmo? Ainda pensei que fosse para ver um evento num dia diferente, mas ser é só para ver a duração de um determinado evento, não estou a ver a necessidade de ter interacção aqui	EX6	VIS	DESIGN	NONE
Expert J. Abreu	24/02/2020	23	1	[Trivial] Os eventos estão a abrir numa tab nova em vez de navegarem na mesma página	EX6	INT	DESIGN	PS1
Expert J. Abreu	24/02/2020	23	1	[Trivial] A mudança do layout para a pesquisa não é imediatamente perceptível sem uma animação	EX6	INT	DESIGN	NONE
Expert J. Abreu	24/02/2020	23	1	[Trivial] "última atualização a" nem sempre faz sentido (e.g. na homepage)	EX6	PSOC	ACCESSIBILITY	NONE
Expert J. Abreu	24/02/2020	23	1	[Trivial] O alinhamento do "última atualização a", dependendo da página, parece um pouco estranho	EX6	VIS	DESIGN	NONE
Expert J. Abreu	24/02/2020	23	1	[Minor] O layout das notícias quando elas são text-heavy é um pouco estranho	EX6	VIS	DESIGN	NONE
Expert J. Abreu	24/02/2020	23	1	[?] Questão existencial – não faria mais sentido, no contexto de notícias, que houvesse paginação em vez de "infinite scrolling"?	EX6	INT	DESIGN	NONE
Expert J. Abreu	24/02/2020	23	1	[Trivial] Questão ongoing – primeira letra em maiúscula?	EX6	VIS	DESIGN	NONE
Expert J. Abreu	24/02/2020	23	1	[Trivial] O texto não está c/ a mesma altura da divisória; faz com que pareça desalinhado no meio da barra	EX6	VIS	DESIGN	NONE
Expert J. Abreu	24/02/2020	23	1	[Minor] Margens a mais acima e abaixo do título	EX6	VIS	DESIGN	PS1
Expert J. Abreu	24/02/2020	23	1	[?] Há algum arquivo que permita ver as notícias ordenadas por data?	EX6	ARQINF	POLITICAL	NONE
Expert J. Abreu	24/02/2020	23	1	[Trivial] Era fixe haver alguma forma de perceber que o subtítulo é uma tag. Um hashtag ou assim?	EX6	VIS	DESIGN	NONE
Expert J. Abreu	24/02/2020	23	1	[Trivial] Categoria podia ser clicável	EX6	INT	DESIGN	PS1
Expert J. Abreu	24/02/2020	23	1	[Trivial] Selects podiam ser mais largas em desktop (têm espaço para isso)	EX6	VIS	DESIGN	PS1
Expert J. Abreu	24/02/2020	23	1	[Trivial] O + não faz nada, mas aparece como clicável	EX6	INT	DESIGN	PS2
Expert J. Abreu	24/02/2020	23	1	[?] O UX do calendário ao andar para trás para depois permitir voltar não foi algo que percebi logo. Aqui estaria à espera de umas setas que me permitissem fazer "scroll" no calendário para seleccionar o dia que quero, mas – percebo a dificuldade disto a nível de fazer uma UI decente e perceptível. Também não é muito importante a nível de prioridade tendo em conta que já está feito.	EX6	UX	DESIGN	PS1
Expert J. Abreu	24/02/2020	23	1	[Minor] As horas do evento não fazem muito sentido quando ele dura vários dias	EX6	PSOC	POLITICAL	NONE
Expert J. Abreu	24/02/2020	23	1	[Trivial] A lista inteira de eventos está a fazer refresh quando carregamos mais. Só seria preciso adicionar os novos eventos ao final, mas diria que está a acontecer alguma coisa por trás para causar o refresh	EX6	INT	DESIGN	PS1
Expert J. Abreu	24/02/2020	23	1	[Trivial] Navegação com branco em cima de cinzento foi difícil de ver à cabeça	EX6	VIS	DESIGN	NONE
Expert J. Abreu	24/02/2020	23	1	[Minor] Há algum problema que faz com que esta tooltip não feche quando navegamos para a página de acessibilidade	EX6	INT	DESIGN	PS2


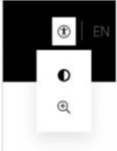


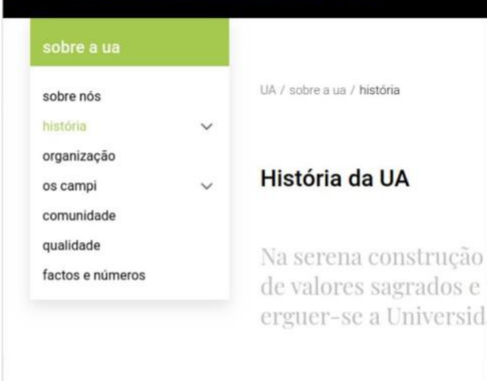
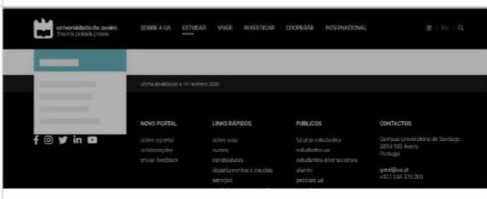
Expert J. Abreu	24/02/2020	23	1	[?] Faz sentido permitir navegar para o segundo ponto das breadcrumbs, que é a página actual? Neste momento está a fazer refresh à página inteira; podia simplesmente não ser clicável, ou não fazer nada.	EX6	INT	DESIGN	PS2
Expert J. Abreu	24/02/2020	23	1	[?] O menu podia ficar aberto durante a navegação	EX6	INT	DESIGN	NONE
Expert J. Abreu	24/02/2020	23	1	[Trivial] Quando entramos numa categoria, o sub-menu da categoria podia ficar aberto	EX6	INT	DESIGN	NONE
Expert J. Abreu	24/02/2020	23	1	[Trivial] Há ali margens a mais no título, parece-me	EX6	VIS	DESIGN	NONE
Expert J. Abreu	24/02/2020	23	1	[Major] Podiam definir uma altura mínima do container principal do conteúdo para evitar os flickers quando mudamos de página. Eventualmente isto também pode ajudar os saltos de largura por estar sempre a tirar e a adicionar a scrollbar	EX6	VIS	DESIGN	NONE
Expert J. Abreu	24/02/2020	23	1	[?] Quando carrego no 'atividade científica', a minha expectativa é que ele vá abrir o submenu; falta ali algum feedback para indicar que ele vai navegar para outra página, se clicado	EX6	INT	DESIGN	NONE
Expert J. Abreu	24/02/2020	23	1	[Major] O link do breadcrumb para 'estudar' está partido	EX6	VIS	DESIGN	PS1
Expert J. Abreu	24/02/2020	23	1	[Trivial] Os sub-itens podiam estar ligeiramente indentados para se perceberem melhor	EX6	VIS	DESIGN	NONE
Expert J. Abreu	24/02/2020	23	1	[Major] Pesquisa por nome não dá prioridade ao primeiro nome	EX6	ARQJNF	TECHNICAL	NONE
Expert J. Abreu	24/02/2020	23	1	[Trivial] Não há forma de remover a navegação por letra sem carregar de volta no Pessoas	EX6	ARQJNF	TECHNICAL	NONE
Expert J. Abreu	24/02/2020	23	1	[?] Há alguma vantagem em só mostrar os botões de navegação em hover?	EX6	VIS	DESIGN	NONE
Expert J. Abreu	24/02/2020	23	1	[Trivial] Breadcrumbs a mais?	EX6	BUG	TECHNICAL	PS2
Expert J. Abreu	24/02/2020	23	1	[Trivial] Os e-mails nos contactos podiam ser links de mailto	EX6	PSOC	DESIGN	PS1
Team member comments	EX1							
Social Network Post	EX2							
Comments Teams App	EX4							
Expert Review	EX6							
Adjusment			PS1					
Corrections			PS2					
New Features			PS3					







2. Expert Review Sheet Report

Expert Review J. Abreu (Alumni)			
URL	Tópico	Snapshot	Comentários CS
https://www.ua.pt/	[Trivial] Padding de cima não é igual ao de baixo. Deve ser uma mistura da altura dos separadores e do line-height do texto		Ok. Flávio pode ver. Feito
https://www.ua.pt/	[Trivial] A cor do botão está demasiado escura?		A estudar pela equipa de design
https://www.ua.pt/	[Minor] O layout com a imagem no canto fica um pouco estranho [Trivial] O feedback do hover ser apenas zoom na imagem não é inteiramente perceptível		A estudar pela equipa de design
https://www.ua.pt/	[Trivial] A área de hover do tooltip é demasiado restrita		Ok. Flávio pode ver. Feito
https://www.ua.pt/	[Trivial] O lado esquerdo do + não é clicável		Ok. Flávio pode ver. Feito
https://www.ua.pt/	[Trivial] Todo este texto não é seleccionável?		Ok. Flávio pode ver. Ta feito
https://www.ua.pt/	[Minor] As setas não mudam o cursor em hover [Trivial] O estado desactivado das setas podia ser mais escuro para se destacar mais [Trivial] Porque é que aqui dá para navegar nos dias, mesmo? Ainda pensei que fosse para ver um evento num dia diferente, mas ser é só para ver a duração de um determinado evento, não estou a ver a necessidade de ter interacção aqui		Ponto 1 - Ok. Flávio - Feito Ponto 2 - A verificar pela equipa de design Ponto 3 - O objetivo é conseguir ver a duração do evento. Não se encontrou solução para ter as duas datas naquele local. Se aparecer uma boa ideia podemos alterar mas não é crítico.

URL	Tópico	Snapshot	Comentários CS
https://www.ua.pt/	[Trivial] Os eventos estão a abrir numa tab nova em vez de navegarem na mesma página		Ok. Resquícios de quando os eventos iam ligar ao uaonline antigo. Flávio pode corrigir Supostamente está certo
https://www.ua.pt/	[Trivial] A mudança do layout para a pesquisa não é imediatamente perceptível sem uma animação		Ok. Validar pela equipa de design
https://www.ua.pt/	[Trivial] "última atualização a" nem sempre faz sentido (e.g. na homepage) [Trivial] O alinhamento do "última atualização a", dependendo da página, parece um pouco estranho		Ponto 1 - Equipa de comunicação rever Ponto 2 - Equipa de design rever
https://www.ua.pt/pt/noticias/13	[Minor] O layout das notícias quando elas são text-heavy é um pouco estranho		Discutível. Eu gosto :) Mas deve ser analisado pela equipa de design
https://www.ua.pt/pt/noticias/11	[?] Questão existencial -- não faria mais sentido, no contexto de notícias, que houvesse paginação em vez de "infinite scrolling"?		É uma excelente questão :) "Infinite scrolling" é mais bonito e moderno mas a paginação permite navegar no tempo de forma mais adequada. A analisar pelas equipas de Comunicação e Design. Existe alguma dificuldade ao nível de implementação com a API que temos?
https://www.ua.pt/pt/noticias/contactos	[Trivial] Questão ongoing -- primeira letra em maiúscula? [Trivial] O texto não está c/ a mesma altura da divisória; faz com que pareça desalinhado no meio da barra		Ponto 1 - Vários locais do Portal utilizam esta grafia. Não me parece incorreto mas a rever pela equipa de design Ponto 2 - A rever pela equipa de design O alinhamento já está

URL	Tópico	Snapshot	Comentários CS
https://www.ua.pt/pt/noticias/sobre	[Minor] Margens a mais acima e abaixo do título		A rever pela equipa de design
https://www.ua.pt/pt/noticias/	[?] Há algum arquivo que permita ver as notícias ordenadas por data?		Acho que são sempre vistas pela data de publicação. Uma notícia pode ter várias datas associadas e não é uma decisão simples.
https://www.ua.pt/pt/noticias/18318?tag=true?n=escola%20de%20inverno	[Trivial] Era fixe haver alguma forma de perceber que o subtítulo é uma tag. Um hashtag ou assim?		Foi um assunto discutido e tenho ideia que a opção de design foi ficar assim porque não existia necessidade de fazer essa diferenciação. A ver o que diz a equipa de design
https://www.ua.pt/pt/noticias/12/62682	[Trivial] Categoria podia ser clicável		Ok. Flávio pode ver.
https://www.ua.pt/pt/agenda	[Trivial] Selects podiam ser mais largas em desktop (têm espaço para isso)		Ok. A rever pela equipa de design
https://www.ua.pt/pt/agenda	[Trivial] O + não faz nada, mas aparece como clicável [?] O UX do calendário ao andar para trás para depois permitir voltar não foi algo que percebi logo. Aqui estaria à espera de umas setas que me permitissem fazer "scroll" no calendário para seleccionar o dia que quero.		Rever o ponto 1. Ponto 2 - Concordo, mas até acho interessante depois de perceber o funcionamento. A equipa de avaliação poderá dedicar alguma atenção a esta questão, mas dando uma prioridade baixa.
https://www.ua.pt/pt/agenda	[Minor] As horas do evento não fazem muito sentido quando ele dura vários dias		Discutível... A rever pela comunicação e design
https://www.ua.pt/pt/agenda	[Trivial] A lista inteira de eventos está a fazer refresh quando carregamos mais. Só seria preciso adicionar os novos eventos ao final, mas diria que está a acontecer alguma coisa por trás para causar o refresh		Ok. Vitor pode rever Feito

URL	Tópico	Snapshot	Comentários CS
https://www.ua.pt/pt/publico-sociedade	[Trivial] Navegação com branco em cima de cinzento foi difícil de ver à cabeça		Assunto já muito discutido :) Não vou insistir numa revisão.
https://www.ua.pt/pt/acessibilidade	[Minor] Há algum problema que faz com que esta tooltip não feche quando navegamos para a página de acessibilidade		Ok. Flávio pode ver. Feito
https://www.ua.pt/pt/acessibilidade	[?] Faz sentido permitir navegar para o segundo ponto das breadcrumbs, que é a página actual? Neste momento está a fazer refresh à página inteira; podia simplesmente não ser clicável, ou não fazer nada.		Parece-me um erro. Não devia existir o segundo link das breadcrumbs.
https://www.ua.pt/pt/universidade	[?] O menu podia ficar aberto durante a navegação		Muito discutível :) Esta solução foi o compromisso para garantir uma maior visibilidade dos conteúdos dos módulos que existem na página de entrada das áreas que têm esses menus laterais.
https://www.ua.pt/pt/historia	[Trivial] Quando entramos numa categoria, o sub-menu da categoria podia ficar aberto [Trivial] Há ali margens a mais no título, parece-me		Ponto 1 - Tenho ideia de já ter conversado sobre essa questão mas existia uma dificuldade qualquer de implementação. Vitor, podes rever o assunto? Ponto 2 - A rever pela equipa de design
https://www.ua.pt/pt/estudar	[Major] Podiam definir uma altura mínima do container principal do conteúdo para evitar os flickers quando mudamos de página. Eventualmente isto também pode ajudar os saltos de largura por estar sempre a tirar e a adicionar a scrollbar		Gosto da ideia. A rever pelo Flávio

URL	Tópico	Snapshot	Comentários CS
https://www.ua.pt/pt/investigacao	[?] Quando carrego no 'atividade científica', a minha expectativa é que ele vá abrir o submenu; falta ali algum feedback para indicar que ele vai navegar para outra página, se clicado		Complexo de resolver. Esta já foi uma solução depois de muitas outras terem sido testadas. A opção foi um mix de uma ação imediata e de abertura do menu.
https://www.ua.pt/pt/estagios-emprego	[Major] O link do breadcrumb para 'estudar' está partido		A rever. Não sei se pelo Vitor se pela equipa de comunicação edit: resolvido
https://www.ua.pt/pt/cidades-ua	[Trivial] Os sub-itens podiam estar ligeiramente indentados para se perceberem melhor		Discutível. A equipa de design não gosta de indentações e julgo que não existem em lado nenhum do Portal.
https://www.ua.pt/pt/pesquisa/p/?q=pedro	[Major] Pesquisa por nome não dá prioridade ao primeiro nome [Trivial] Não há forma de remover a navegação por letra sem carregar de volta no Pessoas		Ponto 1 - Podemos ver se o Bruno consegue melhorar a query de pesquisa Ponto 2 - Já tinha reparado nisso e esqueci-me de reportar. A rever pelo Vitor.
https://www.ua.pt/pt/viver	[?] Há alguma vantagem em só mostrar os botões de navegação em hover?		Pode ser revisto pela equipa de design mas parece-me que o objetivo foi tornar a interface mais "clean". Eu gosto como está :)
https://www.ua.pt/pt/contactos-gerais	[Trivial] Breadcrumbs a mais?		Deve ser o mesmo problema reportado anteriormente na página de "Acessibilidade". Também acontece na página de "Proteção de dados"

URL	Tópico	Snapshot	Comentários CS												
https://www.ua.pt/pt/contactos-gerais	[Trivial] Os e-mails nos contactos podiam ser links de mailto	<p>Órgãos da UA</p> <hr/> <table> <tr> <td>Administração</td> <td> Telefone: +351 234 372 565 Fax: +351 234 372 566 Extensão interna: 52100 administracao@ua.pt </td> </tr> <tr> <td>Conselho Científico</td> <td> Extensão interna: 21001 cientifico@ua.pt </td> </tr> <tr> <td>Conselho Geral</td> <td> Telefone: +351 234 372 523 Extensão interna: 21001 conselho.geral@ua.pt </td> </tr> <tr> <td>Conselho Pedagógico</td> <td> Telefone: +351 234 401 565 cpedagogico@adm.ua.pt </td> </tr> <tr> <td>Provedor do Estudante</td> <td> Telefone: +351 234 370 987 provedor@ua.pt </td> </tr> <tr> <td>Reitoria</td> <td> Telefone: +351 234 370 606 Fax: +351 234 370 089 Extensão interna: 22000 </td> </tr> </table>	Administração	Telefone: +351 234 372 565 Fax: +351 234 372 566 Extensão interna: 52100 administracao@ua.pt	Conselho Científico	Extensão interna: 21001 cientifico@ua.pt	Conselho Geral	Telefone: +351 234 372 523 Extensão interna: 21001 conselho.geral@ua.pt	Conselho Pedagógico	Telefone: +351 234 401 565 cpedagogico@adm.ua.pt	Provedor do Estudante	Telefone: +351 234 370 987 provedor@ua.pt	Reitoria	Telefone: +351 234 370 606 Fax: +351 234 370 089 Extensão interna: 22000	<p>Ok. A rever pela equipa de comunicação</p> <p>edit: resolvido</p>
Administração	Telefone: +351 234 372 565 Fax: +351 234 372 566 Extensão interna: 52100 administracao@ua.pt														
Conselho Científico	Extensão interna: 21001 cientifico@ua.pt														
Conselho Geral	Telefone: +351 234 372 523 Extensão interna: 21001 conselho.geral@ua.pt														
Conselho Pedagógico	Telefone: +351 234 401 565 cpedagogico@adm.ua.pt														
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Reitoria	Telefone: +351 234 370 606 Fax: +351 234 370 089 Extensão interna: 22000														

3 AMA Accessibility and Usability Seal. Relatório Geral de Usabilidade e Acessibilidade para a candidatura ao Selo Ouro da Agência Nacional para a Modernização da Administração Pública (AMA)

Equipa

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Infraestruturura

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Introdução

Como entidade pertencente ao grupo-alvo da lei que estabelece a adoção de normas em sistemas informáticos do Estado (Lei n.º 36/2011) e do Regulamento Nacional de Interoperabilidade Digital (RNID), Universidade de Aveiro, por meio da equipa do novo Portal da UA, descreve no presente documento as ações voltadas ao cumprimento dos requisitos prescritos pela Agência Nacional para a Modernização Administrativa (AMA) no processo de desenvolvimento do novo portal institucional.

Os esforços evidenciados no âmbito da acessibilidade estão enquadrados no Decreto-Lei nº 83/2018, que define os requisitos de acessibilidade dos sítios web e das aplicações móveis de organismos públicos, transpondo a Diretiva (UE) 2016/2102. Os ciclos de validação e teste seguem as Diretrizes para a Acessibilidade de Conteúdos Web (WCAG 2.1), desenvolvidas pelo World Wide Web Consortium (W3C).

Conforme a especificação da candidatura ao Selo Ouro, estão descritas as principais evidências do trabalho da equipa do novo portal da Universidade de Aveiro (Portal da UA), voltadas à garantia da acessibilidade. Além disso, representam o esforço contínuo em proporcionar a melhor experiência possível aos diferentes públicos.

As informações sumarizam detalhes do público que participou dos testes, data de realização, objetos de análise, metodologia e resultados.

Testes com utilizadores sem deficiências ou incapacidades

Datas dos testes

11 e 12 de setembro de 2019

Objetos em análise

Página principal do portal <https://www.ua.pt/>

Área de notícias <https://www.ua.pt/pt/noticias>

Tarefas solicitadas

1. Visualizar toda a página inicial, do topo ao rodapé (fase de reconhecimento)
2. Identificar os destaques institucionais da página inicial do portal
3. Aceder ao novo sítio de notícias do portal
4. Identificar as notícias em destaque
5. Clicar numa notícia
6. Voltar à página principal do sítio de notícias
7. Ler mais notícias a partir da página de uma notícia
8. Identificar o menu de categorias de conteúdos do sítio de notícias
9. Localizar o botão ver mais
10. Partilhar uma notícia

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Caracterização dos participantes e metodologia

A partir de uma amostragem por conveniência, foram selecionadas 10 pessoas para esta bateria de testes. Os avaliadores identificados como P1, P2, P3, P4 e P5 representam os

trabalhadores da universidade não ligados à atividade de docência e com o mesmo perfil funcional das respetivas unidades orgânicas. Os restantes participantes do teste (P6, P7, P8, P9 e P10) são 5 estudantes recém matriculados, caracterizados pela pouca ou nenhuma familiaridade com o portal e com a instituição.

Perfil por	Área
1. Trabalhador da Universidade	(Biblioteca)
2. Trabalhador da Universidade	(Engenharia Civil)
3. Trabalhador da Universidade	(Administração)
4. Trabalhador da Universidade	(Gestão Técnica)
5. Trabalhador da Universidade	(Engenharia Mecânica)
6. Aluno do 1º ano	(Biologia)
7. Aluno do 1º ano	(Ciências do Mar)
8. Aluno do 1º ano	(Economia)
9. Aluno do 1º ano	(Engenharia Física)
10. Aluno do 1º ano	(Música)



testes com colaboradores não docentes



testes com alunos do primeiro ano



A estratégia em obter inputs destes dois grupos de pessoas com perfis diferentes foi intencional, para evitar o enviesamento dos inputs e resultados e confrontar os mapeamentos mentais de interação entre quem conhece a estrutura da instituição e do portal, com quem não apresentava tanta familiaridade com a universidade e com a sua presença digital.

Uma vez que a prioridade foi aproximar os testes à realidade e contexto dos públicos escolhidos, os trabalhadores avaliaram o portal em *desktop*; já aos estudantes, para além da versão *desktop*, testaram o portal em telemóvel, ambiente em que estão mais imersos no dia a dia, conforme havia sido registado no diário de campo.

As técnicas de teste e as técnicas de recolha de dados utilizadas nos testes centraram-se em Registo Audiovisual, Guião de Tarefas, Avaliação Cooperativa e Registo Verbal das Ações

(Thinking aloud). Foi dada prioridade à análise da capacidade de execução das tarefas. Conforme ilustrado nas tabelas dos resultados, o tempo despendido por cada participante foi também um indicador importante para a equipa avaliar o desempenho das pessoas e a correlação com as dificuldades e problemas detetados.

Foi possível obter 9 inputs que foram incluídos no *backlog* de desenvolvimento da equipa para serem solucionados.

Resultados obtidos

Os principais resultados dos testes de usabilidade e acessibilidade com utilizadores do público geral (pessoas sem deficiência), evidenciaram os seguintes problemas:

1. Dificuldade de voltar ao topo da página.
2. Existência de imagens sem atribuição de link.
3. Dificuldade em voltar à *home* do jornal.
4. Efeito de *dropdown* indesejado no título clicável “Notícias” (h2) em mobile (que deveria funcionar como link de retorno à *home*).
5. Dificuldade de interação com os ícones de partilha devido ao espaçamento e tamanho
6. Ausência de ícone que permite partilha por e-mail e outras redes sociais.
7. Dificuldade em compreender a existência do menu de categoria de notícias.
8. Link sem funcionar no antetítulo das notícias.
9. Botão “+” sem link a funcionar na área dos destaques institucionais da página inicial do portal.

Tarefas	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
T1	sim	sim	sim	sim	sim	sim	sim	sim	sim	sim
T2	sim	sim	sim	sim	sim	sim	sim	sim	sim	sim
T3	sim	sim	sim	não	não	sim	sim	sim	não	sim
T4	sim	sim	sim	sim	sim	sim	sim	sim	sim	sim
T5	sim	sim	sim	sim	sim	sim	sim	sim	sim	sim
T6	sim	sim	sim	sim	sim	sim	não	não	sim	sim
T7	sim	sim	sim	sim	sim	não	sim	não	sim	sim
T8	não	sim	sim	sim	sim	sim	sim	sim	sim	sim
T9	sim	sim	sim	sim	sim	sim	sim	sim	sim	sim
T10	sim	sim	sim	sim	sim	sim	sim	sim	sim	sim
Desempenho	90%	100%	100%	90%	90%	90%	90%	80%	90%	100%
Tempo	8:02	5:27	4:57	7:05	11:05	8:30	10:03	10:59	10:31	9:23

Tabela 1: Desempenho dos participantes em dispositivo desktop. De P1 até P5 são funcionários. E de P6 até P10 são alunos.

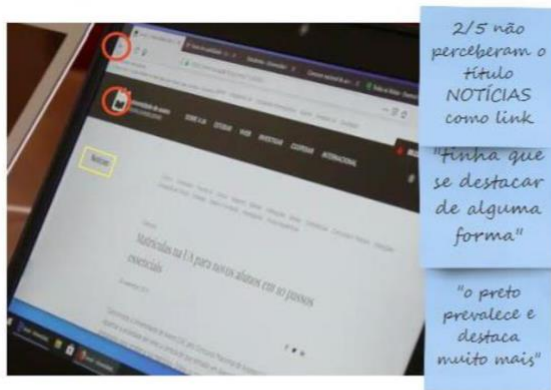
Tarefas	P6	P7	P8	P9	P10
T1	sim	sim	sim	sim	sim
T2	sim	sim	sim	sim	sim
T3	sim	sim	sim	sim	sim
T4	sim	sim	sim	sim	sim
T5	sim	sim	sim	sim	sim
T6	sim	não	não	não	não

T7	sim	sim	sim	sim	sim
T8	sim	sim	sim	sim	sim
T9	sim	sim	não	sim	sim
T10	sim	sim	sim	sim	sim
Desempenho	100%	90%	80%	90%	90%
Tempo	3:06	6:06	6:05	6:21	4:25

Tabela 2: Desempenho dos alunos em dispositivo mobile (telemóvel)

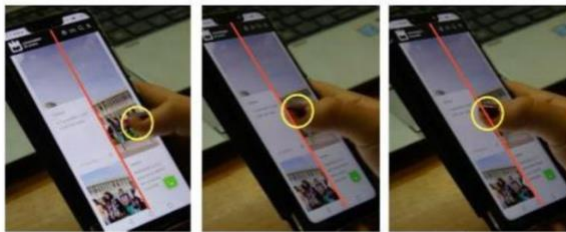
Os resultados obtidos permitiram a identificação de questões relativas às falhas no design visual, no funcionamento das micro interações e nos elementos de *feedback*. As ilustrações que a seguir se apresentam foram apresentadas aos *stakeholders* e são evidências relevantes do processo de avaliação contínua do novo portal da Universidade de Aveiro.

Ilustração 1



Na imagem de cima, no teste feito com colaboradores e alunos em versão desktop, foram assinalados avermelho os locais utilizados pelos avaliadores para regressarem à página inicial de notícias. Como o título “Notícias” (assinalado em amarelo) passou despercebido, os participantes recorreram ao ícone da página principal do portal e à seta do *browser*.

Ilustração 2



O comportamento dos dois públicos foi clicar primeiro na imagem para visualizarem a notícia. Até esta altura as imagens ainda não tinham atribuição de link. A segunda tentativa foi clicar no texto e no símbolo "+".

Ilustração 3 e 4

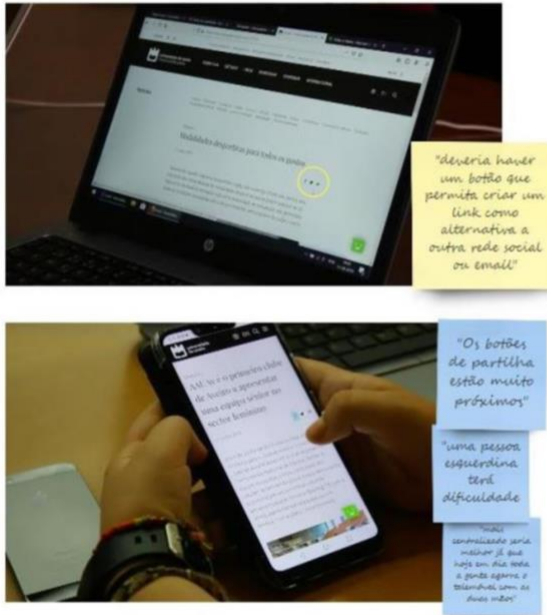


"As notícias são organizadas por tópicos. Gosto disso pois tenho a visão geral e vou ao que mais me interessa"

"poderia haver um botão para ajudar a voltar ao topo"

Exemplos de uso dos botões de navegação em *slider* lateral e de *feedbacks* relacionados a organização dos conteúdos.

Ilustração 5



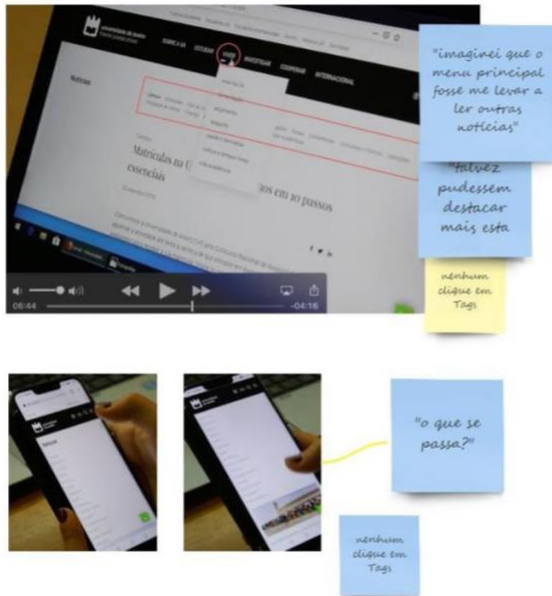
Exemplo em que os avaliadores se queixaram do espaçamento curto entre os ícones das redes sociais e da ausência de um botão para copiar/partilhar link.

Ilustração 6



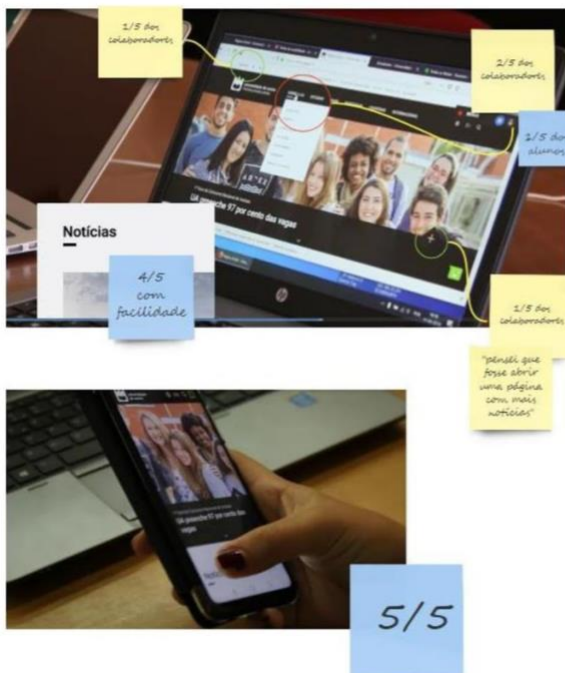
Posicionamento errado da seta de scroll para baixo, na área do título dos destaques institucionais, na página inicial do portal, gerou expectativa errada e deixou os utilizadores confusos durante o teste.

Ilustração 7



Questões da interação com os menus de navegação. Na imagem inferior, dos testes feitos por alunos em mobile, o problema relacionado ao *dropdown* inesperado quando a intenção era clicar no título para voltar à página inicial da área de notícias.

Ilustração 8



Frustração ao clicar no símbolo “+”, na área do título do destaque institucional, devido à falha na consistência em atribuir link ao botão.

Soluções

Após a discussão dos resultados, a equipa do portal definiu as soluções que seriam adequadas para cada necessidade ou problema identificado, conforme apresentado na tabela 3:

Problemas detetados	Soluções desenvolvidas
Dificuldade de voltar ao topo da página.	<i>Botão voltar ao topo.</i>
Imagem sem atribuição de link.	<i>Atribuir link às imagens dos destaques.</i>
Dificuldade de voltar à página inicial da área de notícias.	<i>Aumento do tamanho do título de 16px para 28 px e ajuste na rota de navegação por teclado.</i>
Efeito de dropdown indesejado no título clicável “Notícias” (h2) em mobile (que deveria funcionar como link de retorno à home).	<i>Correção de bug, o título foi retirado da zona clicável para preservar a consistência do título como link para a página inicial em mobile, assim como é em desktop.</i>
Dificuldade de interação com os ícones de partilha devido ao espaçamento e tamanho.	<i>Aumento no espaçamento entre os ícones das redes sociais.</i>
Ausência de ícone que permite partilha por e-mail e outras redes sociais.	<i>Inclusão de “partilhar url” ao conjunto de ícones.</i>
Dificuldade em perceber a existência do menu de categoria de notícias.	<i>Aumento do tamanho da barra e da fonte dos títulos clicáveis.</i>
Link sem funcionar no antetítulo das notícias.	<i>Atribuição de link aos antetítulos (categorias).</i>
Botão “+” sem link a funcionar na área dos destaques institucionais da página inicial do portal.	<i>Atribuição de link ao botão “+”.</i>

Tabela 3: Lista dos 9 problemas detetados com as respetivas soluções implementadas pela equipa de desenvolvimento.

O plano para a resolução dos *inputs* passou por oferecer mecanismos que tornaram mais fáceis a navegação, a interação e o acesso à informação.

Teste com pessoas com deficiência visual e com peritas de acessibilidade da biblioteca da UA

Datas do teste

25 de novembro de 2019 – peritas de acessibilidade da biblioteca

24 de janeiro de 2020 – funcionários da reitoria (invisuais)

Objetos em análise

Página principal do portal

Novo jornal (área de notícias)

Tarefas solicitadas

1. Visualizar toda a página inicial, do topo ao rodapé (reconhecimento)
2. Identificar os destaques institucionais da página inicial do portal
3. Aceder ao novo sítio de notícias do portal
4. Identificar as notícias em destaque
5. Clicar numa notícia
6. Voltar à página principal do sítio de notícias
7. Ler mais notícias a partir da página de uma notícia
8. Identificar o menu de categorias de conteúdos do sítio de notícias
9. Localizar o botão ver mais
10. Partilhar uma notícia

Caracterização dos participantes e metodologia

Uma vez realizada a avaliação do portal da UA com utilizadores que representaram o público geral, bem como a correção dos problemas detetados, foram feitas, em seguida, duas baterias de testes focados na acessibilidade.

A primeira contou com a participação de três funcionárias da biblioteca que atuam como peritas na área da acessibilidade. São responsáveis por ajudar estudantes e outros públicos da UA com deficiência que procuram os serviços da universidade, oferecendo orientação e apoio no uso de tecnologias de apoio

Já a segunda bateria de testes consistiu na execução das mesmas tarefas com pessoas cegas que trabalham na central de atendimento telefónico da reitoria.

A avaliação com as peritas foi realizada em laboratório, num dispositivo desktop com a tecnologia assistiva NVDA. Já com os invisuais as tarefas foram executadas nos seus próprios dispositivos com tecnologias assistivas NVDA no próprio ambiente de trabalho.

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Os avaliadores são identificados como Grupo A (peritas de acessibilidade) e Grupo B (funcionários invisuais).

Perfil	Área	Grupo	Tec. Assistiva
1. Perita de acessibilidade	Biblioteca	A	NVDA
2. Perita de acessibilidade	Biblioteca	A	NVDA
3. Perita de acessibilidade	Biblioteca	A	NVDA
4. Funcionária invisual	Reitoria	B	NVDA
5. Funcionário invisual	Reitoria	B	NVDA
6. Funcionário invisual	Reitoria	B	JAWS

De forma a reforçar os testes um dos funcionários invisuais também executou as tarefas do Guião com o software JAWS, uma vez que essa tecnologia é utilizada na rotina de trabalho.



Foto: Peritas de acessibilidade numa sala de testes em momento de avaliação do portal.

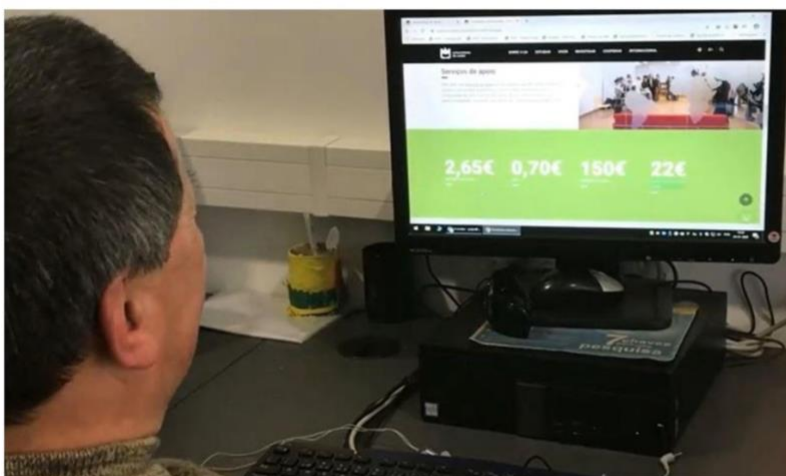


Foto: Invisual, após realizar o teste em NVDA, testa as mesmas tarefas com a tecnologia assistiva JAWS.

As metodologias utilizadas nos testes centraram-se em Registo Audiovisual, Guião de Tarefas, Avaliação Cooperativa e Registo Verbal das Ações (*thinking aloud*), não tendo sido possível levar em consideração a “métrica” tempo em cada uma das tarefas.

Em algumas etapas, o processo de avaliação cooperativa gerou fios condutores para entrevistas mais aprofundadas, já que o principal objetivo foi compreender a necessidade dos utilizadores cegos.

No final, foram criados pontos de contato (*touchpoint*) para validar se os receios e objeções apontados pelas peritas eram, de facto, um problema de acessibilidade para os cegos.

Por fim, as necessidades identificadas nas avaliações realizadas pelos grupos A (peritas) e B (invisuais) foram apresentadas a toda a equipa de desenvolvimento do portal e geraram inputs ao *backlog* do *roadmap* do projeto do novo portal da Universidade de Aveiro.

Resultados obtidos

Durante a jornada desenhada no Guião de Tarefas, as peritas de acessibilidade identificaram 9 problemas para as pessoas cegas. Uma vez executadas as mesmas tarefas do Guião com os utilizadores cegos, a equipa de Avaliação do portal verificou que nem todos os receios levantados pelas peritas eram de facto um problema. Assim, 4 problemas foram comuns entre os dois grupos. Os avaliadores do Grupo B acrescentaram ainda mais 2 problemas, totalizando 6 inputs ao *backlog* da equipa de desenvolvimento do portal.

Na tabela a seguir estão sumarizados os contributos das peritas de acessibilidade (Grupo A), e os resultados do teste realizado com os cegos (Grupo B), com a respetiva decisão da equipa do portal, após a análise dos resultados.

Grupo A (peritas)	Grupo B (invisuais)	Decisão
Alt "em branco" nas quebras de linha gera confusão.	Discordaram: ao <i>alt br</i> ajuda a visualizar que há uma linha branca para organizar o conteúdo.	Manter.
Retirar o efeito de link da data dos destaques.	Discordaram: ajuda e é gera redundância positiva.	Manter.
Falta indicação "ler notícia".	Discordam: atributo link ao título da notícia torna o <i>call to action</i> intuitivo.	Manter.
Inversão entre o título e a imagem.	Discordaram: o <i>alt</i> das imagens ajuda na compreensão da notícia independentemente da ordem.	Manter.
Botão de partilha no meio do fluxo dificulta a compreensão.	Concordaram: gera muitos passos de navegação e quebra a fluidez	Reordenar a sequência
Falta indicação "fim dos destaques".	Discordaram: o <i>alt br</i> deixa claro o limite entre o fim do conteúdo.	Manter.
Ícones de redes sociais entre o título e o texto geram obstáculo na leitura do texto.	Concordaram: gera muitos passos de navegação e quebra a fluidez	Desativar o acesso aos ícones de partilha entre o título e o texto e manter apenas os que estão ao final do texto.
Agenda associada gera obstáculo na leitura do texto.	Concordaram: gera muitos passos de navegação e quebra a fluidez	Reordenar a sequência da agenda para o final da notícia.
Uso de abreviaturas e acrónimos sem	Concordaram: dificulta a	Orientar os

explicar dificulta a compreensão da informação.	compreensão do conteúdo.	jornalistas e produtores de conteúdo sobre as boas práticas.
	Maneira de apresentação da data da notícia dificulta a compreensão.	Deixar mais evidente o termo "data de publicação" no <i>alt</i> do link.
	Bug: Sequência de navegação com teclado salta do título da notícia direto para o rodapé da página.	Corrigir o script.

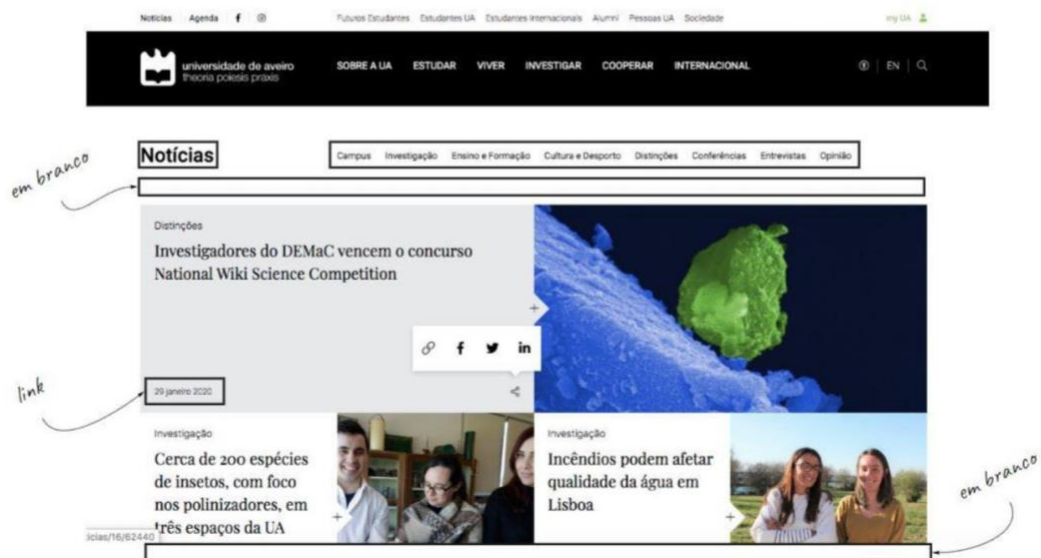
Tabela 4: Resultados do teste de usabilidade com foco na acessibilidade para público invisual

Taxas de sucesso de execução das tarefas

Tarefas	Grupo A	Grupo B
T1	sim	sim
T2	sim	sim
T3	sim	sim
T4	sim	sim
T5	sim	sim
T6	sim	sim
T7	sim	sim
T8	sim	sim
T9	sim	sim
T10	sim	sim
Tarefas concluídas	100%	100%

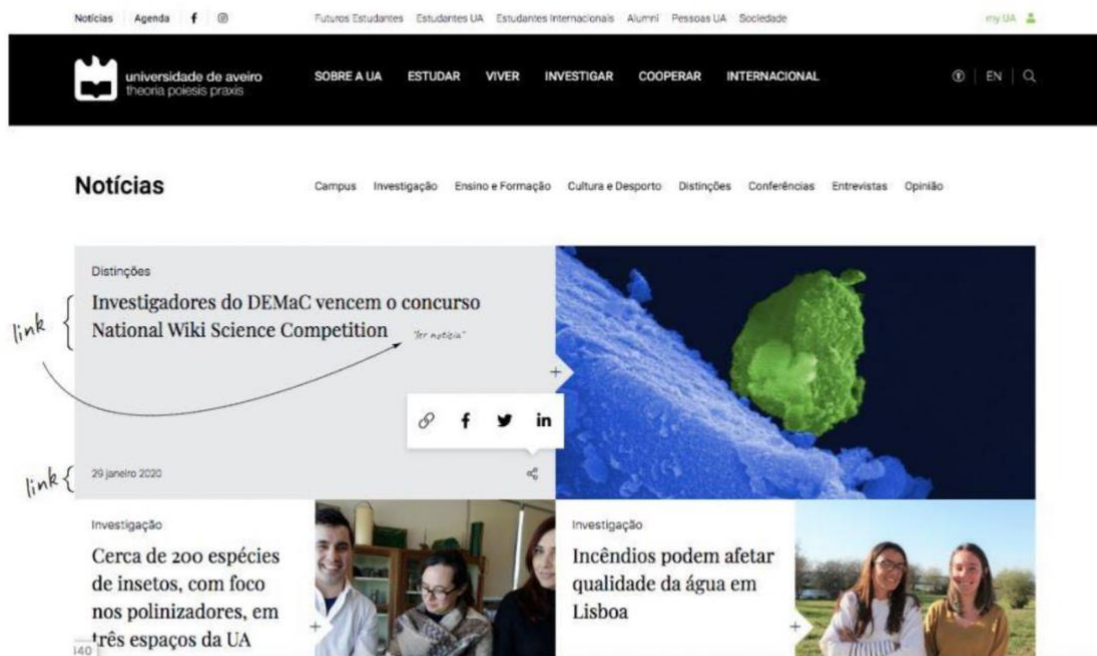
Tabela 5: Percentual de tarefas executadas em desktop com tecnologia assistiva NVDA

Imagem



Na imagem de cima, destaque para a expressão “em branco” no começo e no fim da área de destaques, interpretada pelos leitores de ecrã. Na primeira avaliação, com o Grupo A, as peritas tiveram receio de que a expressão trouxesse alguma confusão. No entanto, no segundo teste, com o Grupo B, os invisuais ressaltaram a importância da expressão “em branco” para que a linha visual branca seja percebida pelo público invisual.

Imagem



Na área com a seta, as peritas sugeriram acrescentar um link “ler notícias”. Ainda assim, esta sugestão foi desconsiderada pelos invisuais pois, segundo eles, o facto de o link já ser um elemento clicável torna a interação mais rápida.

Imagem

universidade de aveiro

SOBRE A UA ESTUDAR VIVER INVESTIGAR COOPERAR INTERNACIONAL

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Notícias

Campus Investigação Ensino e Formação Cultura e Desporto Distinções Conferências Entrevistas Opinião

Cultura e Desporto

Concerto no GrETUA: tons sépia e espíritos sublimes emanam de uma harpa

21 janeiro 2020

f t in

A espanhola residente no Porto, Angélica Salvi, traz a sua harpa ao Espaço GrETUA para interpretar "Phantone", disco de estreia que já foi considerado revelação de 2019. Gravado na ambiência nostálgica do Mosteiro de Rendufe e editado pela Lovers & Lollypops, "Phantone" é um trocadilho que resulta de "phantom" (fantasma, espírito...) e "tone" (tom). O concerto, dia 24 de janeiro, pelas 22h00, é seguido da atuação de Ornamental.

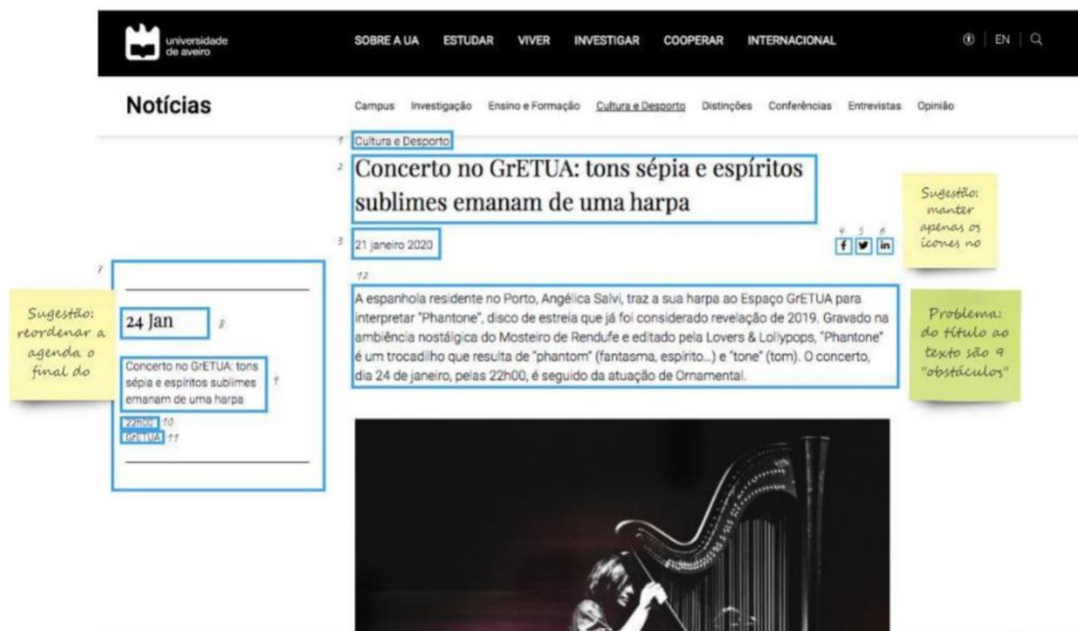
24 Jan

Concerto no GrETUA: tons sépia e espíritos sublimes emanam de uma harpa

22h00
GrETUA

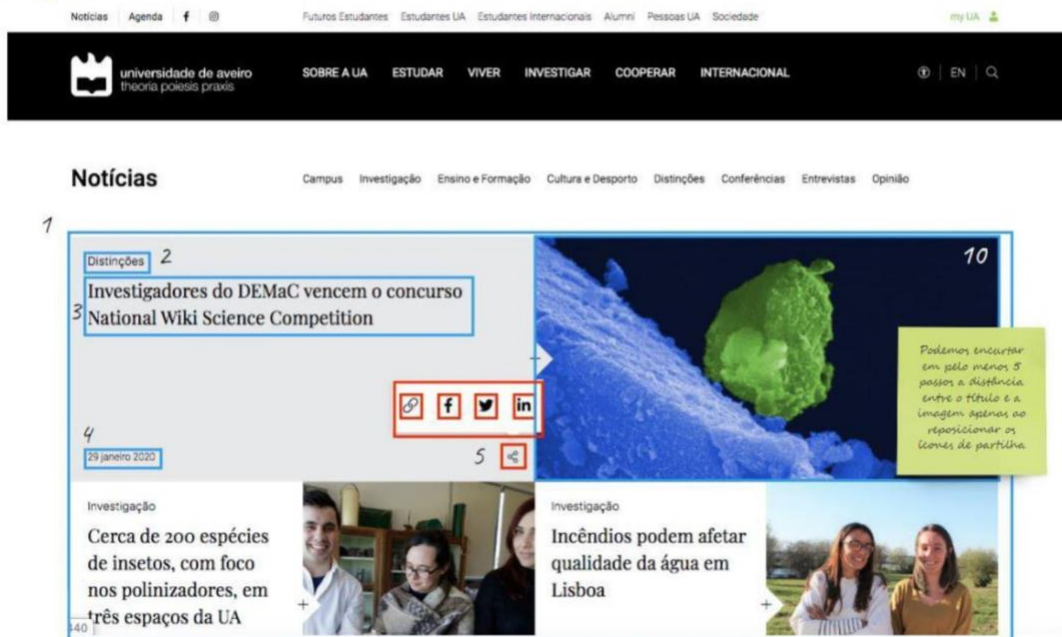
Por vezes, a data da publicação da notícia confunde o utilizador invisual com a data da agenda associada à notícia, presente na lateral esquerda. Isso ocorria porquê, após selecionar a data da notícia (logo após o título), o leitor de ecrã seguia para a leitura da coluna lateral, em vez de ir direto para o corpo do texto. Porém, com a mudança na rota da sequência de navegação, a agenda lateral só é lida depois do leitor passar por todo o texto da notícia.

Imagem



Semelhante à questão anterior, a mudança na rota de navegação dentro da página reduziu a distância entre o título da notícia e o texto da própria notícia. Antes dos testes de acessibilidade o utilizador cego tinha que percorrer 9 passos entre o título de a notícia. Com a ativação para o acesso aos ícones das redes sociais apenas ao final do texto, bem como o reposicionamento da agenda associada, também para o final, o problema foi resolvido.

Imagem



Na área dos destaques das notícias, a ordem de navegação e acesso aos elementos de interação com redes sociais fora modificada para reduzir a quantidade de passos/cliques entre o título e a imagem da notícia, em 5 passos.

Imagem



Na área dos destaques institucionais da página inicial do portal, a informação segue a ordem imagem/texto. Já nos destaques da página inicial das notícias (novo jornal UAOnline), a ordem é inversa, sendo o título seguido de imagem. Apesar da preocupação das peritas ter sido pertinente, os avaliadores invisuais não consideraram este como um problema ou inconsistência, pois o uso do texto alternativo para a descrição das imagens deixa a experiência uniforme.

Soluções

N	Problemas validados (inputs)	Recomendações (acessibilidade)	Resultado (outputs)
1	Botão de partilha no meio do fluxo dificulta a compreensão. Gera muitos passos de navegação e quebra a fluidez	Reordenar a sequência.	Sequência reordenada.
2	Ícones de redes sociais entre o título e o texto geram obstáculo na leitura do texto. Gera muitos passos de navegação e quebra a fluidez	Atribuir link às imagens dos destaques.	Link atribuído.
3	Agenda associada gera obstáculo na leitura do texto. Gera muitos passos de navegação e quebra a fluidez	Desativar o acesso aos ícones de partilha entre o título e o texto e manter apenas os que estão ao final do texto.	Acesso disponibilizado após a leitura do texto.
4	Uso de abreviaturas e acrónimos sem explicar dificulta a compreensão da informação.	Orientar os jornalistas e produtores de conteúdo sobre as boas práticas.	Apoio aos jornalistas e pivots com instruções de boas práticas de acessibilidade e arquitetura da informação.
5	Maneira de apresentação da data da notícia dificulta a compreensão.	Deixar mais evidente o termo "data de publicação" no <i>alt</i> do link.	Resolvido com a solução do problema da linha 3.

6	Bug: Sequência de navegação com teclado salta do título da notícia direto para a roda pé da página.	Corrigir o script.	Script corrigido.
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Tabela 6: Touchpoint dos problemas validados

Os testes realizados contribuíram para a rotina de validação dos requisitos de acessibilidade, em particular considerando os utilizadores cegos do portal da UA, bem como observando o cumprimento das Diretrizes para Acessibilidade de Conteúdos Web – WCAG 2.1:

Nível de conformidade: A	Nível de conformidade: AAA
1.3.2 Meaningful Sequence 2.4.3 Focus Order 3.2.1 On Focus	2.4.4 Link Purpose 3.1.4 Abbreviations

Tabela 7: Problemas identificados conforme as tipologias das diretrizes de acessibilidade

Outras iniciativas

Várias etapas de validação, além das que foram especificadas neste documento, decorreram ao longo do processo de desenvolvimento.

Além do acesso e navegação por teclado e compatibilidade com tecnologias assistivas (leitor de ecrã com sintetizador de voz e/ou sistema de controlo do rato com cabeça em todos os browsers com exceção do Internet Explorer), a opção de navegar em Alto Contraste também é oferecida aos utilizadores. O acesso é disponibilizado no ícone “acessibilidade” em todas as páginas do Portal via menu de topo (principal), onde também é permitido o aumento do Tamanho do Texto (à exceção do Firefox no qual pode ser feito com recurso das teclas de atalho: Ctrl + e Ctrl -).

O mesmo botão dá acesso ainda à página [Acessibilidade](#), cujo o link também está presente no rodapé.



Ilustração: Acessibilidade. Botões de acesso às funcionalidades e informações.

Alto contraste

As cores, os alinhamentos, os tamanhos das fontes e todos os elementos da interface influenciam a experiência de utilização e têm impacto na navegação.

A criação de um Sistema de Design orientado para unicamente para a comunicação da Universidade de Aveiro permitiu que cada componente, do mais simples ao mais complexo, garantisse a identidade visual da UA. Nesse sentido, as cores foram escolhidas cuidadosamente para que o conjunto fosse harmonioso, sempre com a preocupação de manter e reforçar a hierarquia e a consistência.

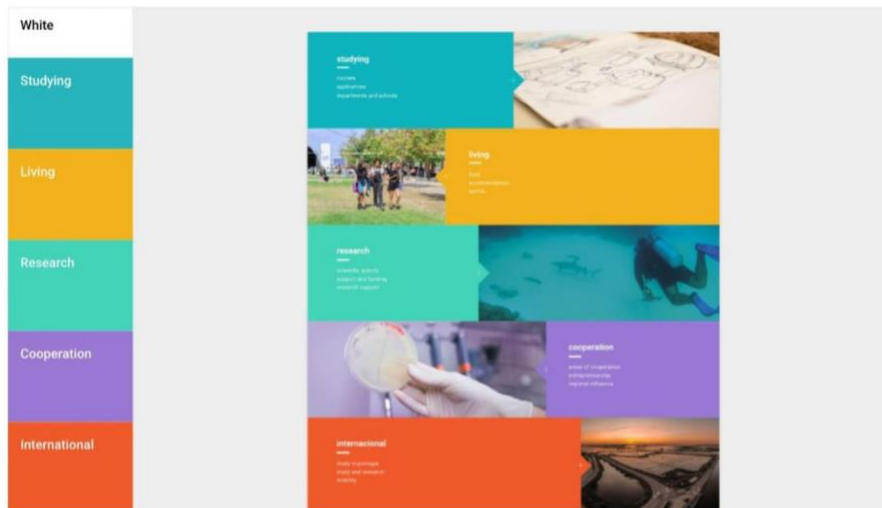


Ilustração: Cores principais da identidade gráfica do portal.

Mesmo com todos esses cuidados, nem sempre os valores de contraste entre as cores dos elementos de primeiro plano e do plano de fundo foram suficientes para que todas as pessoas se sentissem confortáveis a ler as páginas, já que existem utilizadores com baixa visão, dificuldades de discriminação cromática e outras incapacidades decorrentes de questões ligadas ao envelhecimento e a fatores genéticos ou ambientais, como fadiga ou o alto tempo de exposição aos ecrãs. O Alto Contraste é uma das funcionalidades disponíveis no botão de Acessibilidade, presente na barra principal de navegação.

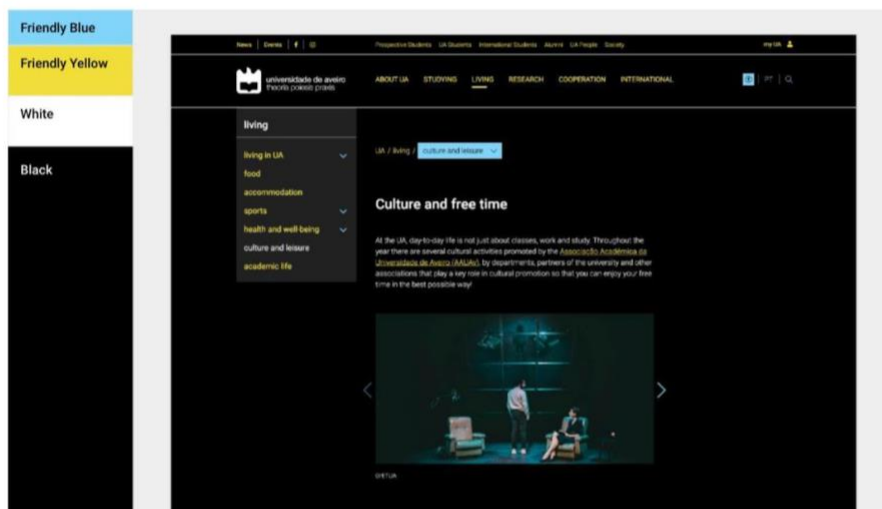


Ilustração: Cores principais do modo de alto contraste.

Antes de ser colocado em produção, o protótipo do modo de Alto Contraste foi validado pelas peritas de acessibilidade e por um colaborador daltónico (com protanopia),

Vídeo acessível

Permitir a publicação do primeiro vídeo na área de destaques do portal da UA foi outro grande desafio enfrentado pela equipa. Primeiramente, pelo facto de o módulo ter sido inicialmente

desenhado para suportar fotografias e imagens estáticas. Em segundo lugar, porque, para que um vídeo esteja na área de destaques da página principal é necessário que o conteúdo atenda aos requisitos básicos de acessibilidade, tais como:

- legendas, voz off de audiodescrição (em português e inglês);
- língua gestual (portuguesa e inglesa);
- acesso com o teclado ao botão da opção de assistir ao vídeo com audiodescrição;
- acesso com o teclado ao painel de controlo do vídeo (iniciar, pausar, volume e outros);
- bloqueio do modo autoplay.

Para assegurar o cumprimento destes os requisitos, o projeto do novo portal da UA procurou garantir a permanência da indicação máxima de acessibilidade do World Wide Web Consortium (W3C) , conhecido como selo triplo A (AAA, nível máximo de acessibilidade).

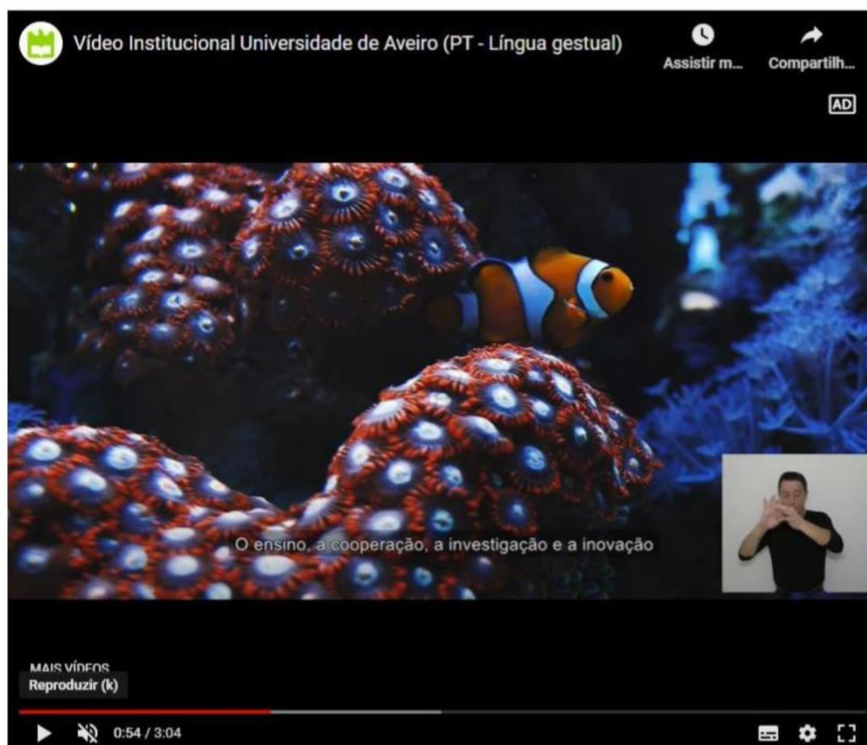


Ilustração: Vídeo acessível lançado em janeiro de 2020.

Dentro do percurso metodológico, foram necessárias reuniões para orientar os produtores do vídeo sobre as boas práticas e diretrizes de acessibilidade e ainda validar o roteiro com utilizadores com debilidades de origem visual e da fala.



Foto: Utilizador cego opinar sobre o trabalho relativo ao vídeo acessível. "Eu estou a visualizar à minha maneira aquilo que está a passar na imagem. É um trabalho muito bem feito.", afirmou o colaborador Carlos Pereira, que nasceu sem a visão.

O resultado deste trabalho representa um esforço coletivo e pode ser visto nesta [notícia](#). Tais atitudes evidenciam que a inclusão e a procura da satisfação dos utilizadores são premissas no projeto.

4. Video transcription of the blind feedback regarding the accessible video.

Transcrição dos depoimentos dos invisuais sobre o vídeo em audiodescrição.

Data da entrevista: 09 de Janeiro de 2020

[Jorge]

«enquanto ela está agora a falar está-se a ver essas... o que ela estava a dizer.

A vista aérea do campus... do jogo de huggy. Ect, etc, é isso?

((continua a ver o vídeo: (ad) *investigadora recolhe amostras. Imagem de projecto científico. Investigadora observa em microscópio. Investigadora a fazer uma experiência. Robô faz uma venha. Mapa mundo colado em vidro. Um grupo de alunos cumprimenta-se. Duas alunas falam. E sempre o sal. Porque esta é a Universidade de Aveiro. A universidade das pessoas, alquimistas da água, da terra, do ar. (ad) imagens aéreas das salinas.*

- E então, o que você achou?

« Epá. Isso até comove, fogo!

- (risos) Comove?

«Podes crer!! Tá muito fixe! (com mãos no rosto a chorar)

- Ficou emocionado?!

«Podes crer!

- E a gente está aqui para agradecer vocês por nos ajudar a trabalhar melhor...

«Podes crer! (a chorar, cliente levanta-se e abraça o pesquisador)

- Que abraço bom meu amigo!

[fim do primeiro depoimento]

Após o momento de emoção, pesquisador retorna ao sítio onde trabalham os invisuais. O cliente Jorge, presente na conversa anterior, continuava a assistir ao vídeo, desta vez, em seu computador de trabalho. O mesmo volta a falar em entrevista:

[segundo depoimento do Jorge]

- Então Jorge, me diga o que essa atitude de colocar um vídeo em audiodescrição transmitiu para si?

« Epá, em primeiro lugar transmitiu para mim uma maneira de ver a universidade, a nova versão da preocupação que a universidade tem em ser inclusiva, e transmitiu a mim pessoalmente uma grande emoção.

- Aquela reacção tem algum motivo?

«Epá. Tem porque não é muito normal, não é muito habitual as instituições preocuparem-se assim com a integração e com a inclusão. As pessoas vivem mais para o que é quantidade e não para aquilo que é qualidade. E, neste caso, a universidade revelou que tem uma grande capacidade para a qualidade e não para a quantidade.

«Nós é que sentimos quais são as nossas necessidades. Muitas das vezes os projectistas, inclusivamente os projectistas da acessibilidades e etc, etc... quando dizem "Ah, vamos fazer assim", mas aquilo que eles acham no gabinete, o que eles acham no computador não é aquilo que nós achamos na prática. Então lá está, quando nós andamos no balanço das ondas do mar é que enjoamos com o balanço da coisa. Estás a perceber?

- Sim.

« Vocês fizeram o trabalho a começar pelos alicerces, não foi a começar pelo telhado, como muita gente que quer fazer trabalho para a inclusão mas sabem fazer porque começam pelo telhado. Isto por que? Porque não consultam as pessoas que têm a sensação correta, a sensação exacta, a real. Vocês têm uma sensação parcial, imaginam que deve ser assim. Muitas das vezes não é aquilo que vocês imaginam.

- Não chega nem perto, não é? Por mais que a gente busque estar próximo de vocês e de tentar perceber.

« Portando aqui neste caso vocês disseram, epá, nós vamos fazer assim. O que é que vocês acham. O André Calisto antes disto ir para ar, uma vez ligou-me e disse: "Epá, olha lá"... mas não me disse que era ele que estava a fazer isso. Disse: "Epá nós estamos a fazer o trabalho do vídeo, e tal, não sei o que... como é que vocês veem a audio descrição?" E eu: "Epá, audiodescrição... enquanto está a passar a imagem alguém tem que estar num voz off por trás a dizer o que é que está a passar. (André disse:) "Epá, e o que é que tu achas disto assim e assim? Enquanto uma miúda anda de bicicleta nos passadiços da ria, a dizer isto assim e assim?" E eu disse-lhe: "está ótimo" . Agora tem é que enquadrar as coisas dentro do sítio, que é para depois a descrição da imagem não ficar desfasada da mesma imagem. E foi o que tu disseste, muitas das vezes vocês têm que dar uma aceleraçãozinho à voz para encaixar no mesmo sítio.

[fim depoimento Jorge]

Depoimento do utilizador Carlos:

«Eu vi primeiro sem a audiodescrição porque andei um pouquinho para baixo e vi o play e entrei. E eu estava a dizer ao Jorge: - "mas epá, eu estou a ver o vídeo mas não estou a ver a audiodescrição. Lá está, o que eu estava a ouvir era a música do vídeo, só que... a música é bonita e de facto foi bem escolhida, mas eu não estava a perceber o que é que se estava a passar enquanto corria a música. E assim, com esta audiodescrição eu estou a visualizar à minha maneira aquilo que está a passar na imagem.

- Então deu uma diferença na sua experiência ao acessar com audiodescrição e sem audiodescrição?

« Deu, exactamente. Consigo ver. Pronto, estou a ver neste momento o vídeo e o que está a passar. Por exemplo, neste momento está uma investigadora a observar ao microscópio, um robô que está a fazer uma venha, aparece o mapa mundo, pronto e sabemos o que é que está a passar durante a música. Os alunos que se cumprimentam... E portanto... aparece uma imagem da biblioteca... Epá, dá para percebermos aqui, dá para ficarmos enquadrados... imagens das salinas... e acaba aqui o vídeo. E noto, ouço a água, não é... e dá para percebermos que... e pronto, lá está...

- Enquanto cliente?

«enquanto cliente sou extremamente satisfeito. Acho que foi uma aposta excelente. Não sei quem foi o mentor desta de audiodescrição, mas tu disseste que foram muitos, foram todos, mas de facto foi uma ideia extraordinária. De facto, valeu mesmo a pena.