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Article

Applicability of the User Experience Methodology: Communication and Employment Web Portal for Older Adults

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Abstract
The purpose of this study is to redesign a web portal, oriented to communication and employment management for older adults, from the perspective of user experience, using the user experience methodology. The graphic and functional elements of the platform were considered, enhancing the effectiveness of the communication and inclusion processes and accessibility to employment opportunities. The study is part of a mixed investigation, attending the following stages: (a) exploration of the users of the ServiSenior portal platform during 2021 (constituted by 11 collaborators, 15 clients, and 30 older adults); (b) documentary analysis of the state of the art of employment portals for older adults; (c) proposal design incorporating user experience improvements; (d) testing to validate the value proposition delivered to the target audience. The results obtained were taken into account in decision-making for the approach to the design of the digital portal. This proposal is theoretically based on user-centered design, from which the user experience methodology emerges, which seeks to improve the use and quality of services of digital portals centered on users, emphasizing the attribute of universal use and access. The results obtained enhance the applicability of digital tools that serve to insert a vulnerable population in work spaces, assuming as a starting point design, accessibility, and ease of use.

Keywords
older adults; senior inclusion; user-centered design; user experience; UX methodology; web portal

Issue
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1. Introduction

Given the dizzying dynamics of current communication, interaction with digital environments has become essential to carry out activities of daily life: work, education, and social relationships, among others. Therefore, the design of accessible virtual environments is essential to guarantee use and access for the greatest number of people (World Wide Web Consortium, 2018), particularly vulnerable groups, especially the elderly. The world is witnessing an accelerated aging of the population (Economic Commission for Latin America and the Caribbean, 2014), it is estimated that by the year 2025, people over 60 years of age will represent a third of the world population, while by the year 2050, it is expected that there will be around 2,000 million people in this age range (24% of the total population; Gopal & Murale, 2018; Huang et al., 2017; Huenchuan, 2018). In this same order, in Latin America and the Caribbean, of the 652 million inhabitants in total, 12% is represented by the elderly (more than 78 million people). In Chile, the country where this study was carried out, this population has

increased notably; in 1992, the population over 60 years old amounted to 1,311,699 (9.5% of the total population), while in 2021 it increased to 3,472,243 (17.6% of the total population; Rojas et al., 2022). According to the National Institute of Statistics (2020), in 2019, additionally, the number of older people active in the labor market corresponded to 570,305, equivalent to 6.28% of the total active population in Chile.

In older adults, well-being is associated with the autonomy that they experience by being able to participate fully in the activities of their daily life, leading to improvements in their physical and cognitive abilities, and with an impact on increased longevity (Nordin et al., 2022). In this sense, to facilitate their communicative participation in digital environments, it must be effective. It must be composed of a user interface (UI), and it must offer a user experience (UX) according to their needs: simple, easy to use, and accessible. The effectiveness in communication will then translate into the acceptance and adoption of digital spaces by this group of users, improving their quality of life (Dekker-van Weering et al., 2017; Portz et al., 2019). One of the main uses that older adults make of information and communication technology (ICT) is to inform themselves and communicate with others (Nordin et al., 2022); this reinforces the need to create digital products and services based on user-centered design (UCD), that enables effective communication with this population group.

In line with this described reality, it is necessary to improve or strengthen digital platforms aimed at this age group, for whom the use of technology is considered a difficulty (Gopal & Murale, 2018; Huang, et al., 2017), which provide the employability service in an easy and versatile manner according to their needs and characteristics. In Latin America and especially in Chile, some employability ventures for older adults have emerged, such as the case of ServiSenior, whose main purpose is the insertion of older adults into the labor market (Llorente-Barroso, Anzanello-Carrascoza, & Ferreira, 2023), to reduce the inequality gap, both in age and economic (Jia et al., 2015). After evaluating several platforms with common purposes, this company was selected to carry out this study, due to its inclusive commitment, focused on the elderly population in Chile. In particular, it promotes the development of flexible job opportunities for older adults, who feel active, autonomous, valid, and useful for the job market, an aspect to consider since, according to the data provided by the 2017 Chilean State Census (Instituto Nacional de Estadísticas, 2018), this group is made up of more than two million people in this age range, with projections of continuing to grow.

However, it is necessary to consider that the use of ICTs has collaterally created a new social inequality called the digital gap, which affects the possibilities of use and access of vulnerable social groups, such as the elderly (Gutiérrez-Provecho et al., 2021). The foregoing is the basis of this research, which arises from the need to break this gap and develop digital environments that allow the inclusion and equal access of all to technologies. The digital divide has become a new barrier to social integration and it is accentuated in the elderly, often caused by the insufficient availability of technologies and internet connectivity; therefore, it is one of the main challenges to forging an inclusive ICT (Amaro Agudo et al., 2020; Selwyn, 2004; Varela Ferrío, 2015). In this sense, technologies play a determining role in the social integration of seniors (Llorente-Barroso, Anzanello-Carrascoza, & Ferreira, 2023; Llorente-Barroso, Sánchez-Valle, & Viñarás-Abad, 2023), given the reality of the limited access and use of technology and considering the age of the users in the preferences of use and the effect of adoption of the new media (Llorente-Barroso, Sánchez-Valle, & Viñarás-Abad, 2023; Loos & Ivan, 2022).

The present study was oriented to redesign a communication and employability web portal for this group, based on the application of the UX methodology, which seeks to improve the quality of service of digital portals focused on users, emphasizing the attribute of universal use and access. Taking into account the constant technological advances, which have represented significant changes in the ways of acquiring products and services, the portals for the search and contracting of professional services are required by a high percentage of users, all of them with varied characteristics and needs. The use of online platforms both for job search and for requesting various services has increased exponentially in the world as a result of the Covid-19 pandemic, extending to the present (Agudelo et al., 2020; Inter-American Development Bank, 2020). Within the framework of this global health crisis and the resulting economic consequences, a high percentage of older adults seek to continue in force in the labor market (Llorente-Barroso, Anzanello-Carrascoza, & Ferreira, 2023), despite having exceeded retirement age. This social phenomenon is attributable to multiple factors; however, it has been enhanced by the pandemic, due to the insufficient income received by this population, through the pension systems, less presence of multigenerational households, better levels of health, and longer life expectancy (Economic Commission for Latin America and the Caribbean & International Labour Organization, 2018; Jia et al., 2015).

Based on the above, a redesign of the ServiSenior senior employability service platform was proposed, following the UX methodology developed by Ferrer-Mavárez et al. (2020, 2021), focusing on user expectations, characteristics, and needs in order to offer a better service experience. It begins with an investigation that allows to characterize the different actors who benefited from the digital service, to create a proposal aligned with the expectations and needs of the people (Jia et al., 2015). The design of this type of services, from traditional design methodologies, limitedly considers fundamental aspects of the user, such as the behavior, expectations, and characteristics of people. This

can translate into inconsistencies between usability and user needs, divorces that occur when these products are made without involving people in the design process, creating less equal and equitable proposals, which do not value the richness of diversity (Rodríguez Cely & Ospina Salazar, 2020). Hence, the importance of a UCD allows the creation of products and services by and for people, from a collaborative and participatory perspective between the actors involved: customers, users, and creators (Loebbecke & Powell, 2009).

The redesign of the ServiSenior website made it possible, based on the application of the UX methodology, to offer a website with usable and accessible features for this population (Huang et al., 2017), creating job opportunities for those who face difficulties finding employment alternatives. The term "user experience" is used in the digital industry to emphasize the importance of the pleasant experience people have in the use of a digital product, together with how satisfaction of specific needs can be generated when using it (Ritter & Winterbottom, 2017). This methodology provides a new way of thinking and rethinking digital products, through a process directed by information obtained from the users themselves, in order to understand them in order to create more efficient products (Goodwin, 2009; Mao et al., 2005; Norman, 2013). It allows interaction in an easy, comfortable, and safe way (Nielsen, 2001), in order to guarantee generalized access, under equal conditions for all (Horton & Quesenbery, 2013). Likewise, it seeks to reduce the gaps that prevent access to technological environments, which replicate the social inequalities of the traditional labor market (Gutiérrez-Provecho et al., 2021; Llorente-Barroso, Anzanello-Carrascoza, & Ferreira, 2023), and where the new media create a digital divide for the older audience (Galit, 2017; Llorente-Barroso, Sánchez-Valle, & Viñarás-Abad, 2023)

2. Method

This research was oriented to the application of the UX design methodology in a communication and employment web portal for older adults in order to promote access and inclusion of users (elderly population) to employability websites (Llorente-Barroso, Anzanello-Carrascoza & Ferreira, 2023). The application of this methodology allowed making design decisions for the development of the digital product focused on the characteristics and needs of people, particularly older adults. Based on the principle of iterative development, research and design were applied involving the audience or target audience to obtain relevant information from who makes use of the digital product, in order to justify UCD decisions. In this way, the aim is to promote the development of intuitive, easy-to-use and inclusive products (Lange-Morales et al., 2013). Despite the fact that the ServiSenior portal had a responsive web design prior to the intervention of this study, the research focused its attention on evaluating it through UX and its redesign focused on the computer and smartphone versions. These criteria were considered because the UI is privileged under the premise of mobile-first, although it is accessible to multiple devices; the UX is similar for all devices, as pointed out in the study by Hussain and Mkpojiogu (2015).

The study population consisted of 56 subjects, divided into three groups (Table 1): (a) the collaborators ("stakeholders"), represented by 11 ServiSenior workers from the areas of management, production, design, and development of the website; (b) ServiSenior clients, represented by 15 users external to the organization; (c) older adults (seniors), represented by 30 internal users. We sought to know their experiences during the application process and use of the platform, in order to evaluate the effectiveness of the service offers and their experience when interacting with them. No sampling procedure was carried out since it was considered appropriate to study the total population of users reported

Table 1. Study population.

Phase	Research techniques	Users
Research and analysis	Focus group	• 11 collaborators
	Poll	• 30 older adults • 15 customers
	Customer journey map	• 4 customers
	Card ordering technique (card sorting)	• 5 customers • 5 older adults
Design	Remote associates test (RAT)	• 3 collaborators • 7 customers • 4 older adults
Testing	Usability test	• 5 customers • 5 older adults
	Heat test	• 11 customers

by the ServiSenior company during the first semester of 2021, who voluntarily participated in each inquiry technique required for the phases of the application of the UX methodology.

Based on the considerations described above, a flexible qualitative investigation was developed, whose data allow the deepening of the opinions and assessments from the perspective of the participants (Schettini & Cortazzo, 2015). Initially, the Likert-scale observation record was used, allowing observable, measurable, and replicable data to be obtained (Rivadeneira Rodríguez, 2017). In this sense, the data collected and their analysis, considering the theoretical corpus that supports the application of the UX methodology, allowed us to integrate, discuss, and make inferences as a result of all the information collected and achieve a better understanding of the phenomenon addressed. In the application of the UX methodology, the provision of various techniques and tools that allow knowing the needs of the audiences and making design decisions aligned with the characteristics of the people and the brand is relevant (Nunnally & Farkas, 2016). Accordingly, in this study, various techniques were applied within the research and analysis phase that allowed consolidating both the diagnosis of needs as well as the characterization and analysis for the development of the design. These techniques were selected under the criteria of adequacy to the digital project to be developed (Table 2).

Regarding the data collection techniques described in Table 2, to carry out the triangulation of information from the different actors involved in the process (Jia et al., 2015), the focus group allowed us to learn the service expectations of the collaborators of the company concerning the website (Ivankovich-Guillén & Araya-Quesada, 2011). The survey, carried out on older adults who are employed through the web platform and on clients (subjects who demand the service from the platform), allowed us to understand the needs and requirements according to their particular characteristics (Rubin & Chisnell, 2008), as well as developing an approach to the central information of the project, seeking to have in-depth knowledge of the perceptions, opinions, desires, and emotions of people (Goodwin, 2009; Portigal, 2013). The customer journey maps allowed first-hand knowledge of the experience offered by the website, addressing the problems or positive aspects throughout the user's interaction with the service (Ferrer-Mavárez et al., 2020; Rosenbaum et al., 2017).

Likewise, the card sorting technique was very useful to know the mental models of the users and specify the places where the contents should be organized to facilitate their location, which is based on the observation of how users group, associate, and label the content of a website (Kumar, 2012). The RAT made it possible to verify the graphic concepts and the voice of the brand to be transmitted from the moodboards

Table 2. Data collection techniques.

Phase	Purpose	Techniques	References
1. Research and analysis	1.1. Diagnosis of user needs	• Focus group • Survey	• Ivankovich-Guillén and Araya-Quesada (2011) • Rubin and Chisnell (2008)
	1.2. User characterization	• Heavy user, medium user, and light user (HUMULU) method • Protopersons	• Ferrer-Mavárez et al. (2020)
	1.3. Analysis of user interaction	• User journey map	• Ferrer-Mavárez et al. (2020) • Rosenbaum et al. (2017)
	1.4. Analysis of information architecture	• Content audit	• Jain (2014) • Kumar (2012)
	1.5. Sitemap	• Card ordering technique (card sorting)	• Ferrer-Mavárez et al. (2020)
	1.6. Comparative analysis	• Benchmarking	• Avegno Muñoz et al. (2019)
2. Design	2.1. Creation and evaluation of moodboards	• Moodboards • RAT • Toivainen et al. (2019)	• Nielsen and Thurber (2016) • Ritter and Winterbottom (2017)
3. Prototyped	3.1. Prototyping	• Wireframes, mockups, interactive prototype	• Ferrer-Mavárez et al. (2020) • Ritter and Winterbottom (2017)
4. Testing	4.1. Prototype evaluation	• Heuristic evaluation • Usability test • Heat test	• Choroś (2011) • Molich and Nielsen (1990) • Nielsen (2001) • Sánchez Alvarez et al. (2017)

or canvases of inspiration (Nielsen & Thurber, 2016). The usability test allows us to measure ease of use through efficiency, effectiveness, and user satisfaction (Nielsen, 2001). Finally, the heat test made it possible to interpret the record of user interaction with the website interface (Choroś, 2011).

The application of the UX methodology was carried out based on the five pillars that compose it, which lead to empathize, analyze, design, prototype, and test (Figure 1). In each phase, moments of review, reflection, and changes were stipulated according to the results and feedback from users, which was reflected during the development and design of the product. In this study, the methodology (UX) was based on the necessary applicability in digital communication systems to allow the effective use and access of users (Ferrer-Mavárez et al., 2020, 2021; Nielsen & Thurber, 2016). The study focused its attention on improving the UX of the ServiSenior web portal to allow better access to communication and employability. It sought to establish effective interaction connections with the digital world, based on the design and creation of products connected with consumers (Rowland et al., 2015). It effectively responded to the postulates of design thinking and could be combined with agile development methodologies, to make the website stand out positively through a pleasant experience (Gothelf, 2014; Ritter & Winterbottom, 2017).

3. Analysis of the Results

The following results were evidenced according to the techniques addressed in each phase (Research, Analysis, Design, Prototyping, and Testing), described in Table 2 and based on the experiences of the study population: (a) collaborators (stakeholders), (b) customers, (c) older adults (seniors). They are described below.

3.1. Investigation and Analysis Phase

3.1.1. Diagnosis of User Needs

The focus group allowed a close vision of the needs and expectations of users, guaranteeing their participation, and inclusion in the improvements of the digital environment (Llorente-Barroso, Anzanello-Carrascoza & Ferreira, 2023; Llorente-Barroso, Sánchez-Valle & Viñarás-Abad, 2023). It was developed with 11 ServiSenior collaborators, through a moderated discussion where it was possible to learn about their attitudes, preferences, experiences, and expectations, through interaction and conversation around the ServiSenior web portal. The most significant results pointed to improvements in terms of usability, optimizing the user registration process, and proposing an administration dashboard with a much more intuitive UI.

The first survey was applied to 15 clients (natural persons and legal corporate profiles), a representative sample of 10% of the profile of users who contracted or requested a service from the ServiSenior platform during the second half of 2020. The application of this technique allowed us to know and infer the needs of external users, highlighting that most of the respondents (a) privilege using mobile devices, (b) are loyal to the platform and would request the service again, (c) highlight that the platform contributes to the social integration of the elderly (Llorente-Barroso, Anzanello-Carrascoza & Ferreira, 2023), and (d) consider that the platform must incorporate improvements in terms of usability.

The second survey was applied to 30 older adults in order to learn about their experiences during the application process, as well as the effectiveness of the website's service offerings. The following notable results were obtained: (a) They used mobile devices; (b) they

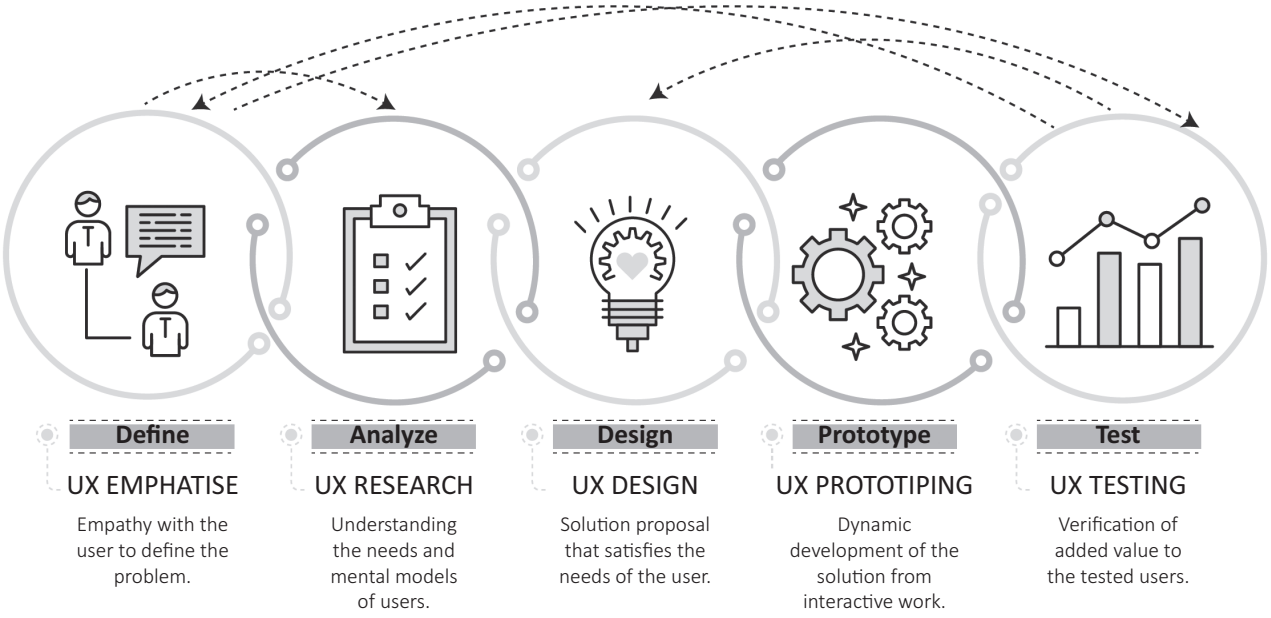

Figure 1. UX methodology. Source: Ferrer-Mavárez et al. (2020, p. 46).

used the internet to search for information in general; (c) they would preferably use the cell phone to contact family and friends, and also for the use of social networks; (d) the application process was complex for them; (e) they privilege using a laptop or computer to access the ServiSenior platform.

3.1.2. User Characterization

The HUMULU method allowed us to know the trends of each of the groups studied (Ferrer-Mavárez et al., 2020), according to the type of use they make of the ServiSenior website as well as the level of familiarity and experience with technology in general. The results of the diagnosis of the user's needs allowed us to reflect on the characteristics of the public and the focus of the product redesign. In this sense, the collaborators were located in the category of "heavy users," due to their high technological capabilities; the different clients were located in a "medium users" profile, considering the average understanding of ict management. finally, the seniors were placed in the "light users" category due to the infrequent use of the technologies, which implies a low experience with the platform and its technology; added to this are the capacities associated with age-related health problems such as cognition, motivation, loss of vision, hearing, and mobility (Gopal & Murale, 2018; Huang, et al., 2017; Nordin et al., 2022; Wildenbos et al., 2018).

The categorization elaborated through the HUMULU method allowed the creation of the most specific user profiles, taking into account their global characteristics (collected during user research), for which the technique of proto-persons (avatars or user models) was used (Ferrer-Mavárez et al., 2020). These are useful for decision-making in the redesign of the ServiSenior website. The proto-persons have the main characteristics and needs of the user groups, for which specific solutions were proposed, which represent premises to be considered for the redesign of the platform (Figure 2).

3.1.3. Analysis of User Interaction

The customer journey map was applied to four clients; its objective was to represent the different possibilities of using the platform, discovering the steps that users follow when interacting with it and the emotions/sensations they experience in the process. This technique made it possible to incorporate innovations in the redesign of the platform, putting people at the center, in order to overcome bad interaction experiences. For this purpose, the different emotions felt by users when they traveled on the ServiSenior website were analyzed, specifically in the search, quote, and contracting of service, while they were observed by expert UX researchers.

It was evidenced that the task of searching for a service on the web platform generates medium to bad

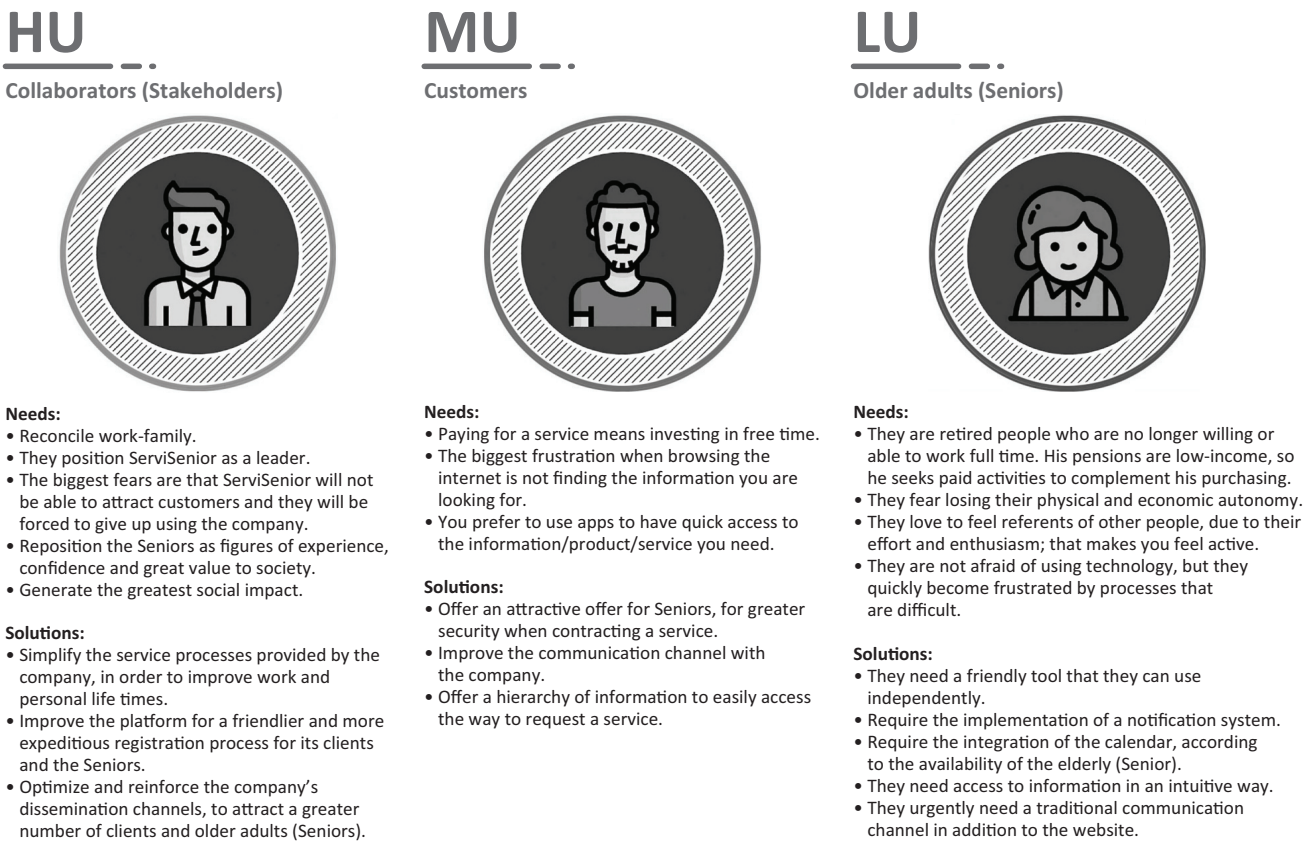

Figure 2. Characterization of proto-persons.

experiences, with the main difficulties detected being confusing information and difficulty finding the service contracting button. Those who managed to complete the task of requesting a quote for a service through the form encountered bad experiences, related to the following recurring difficulties: information that does not correspond to the contracted service, unidentified mandatory fields, and problems completing the form to process the request Information. Likewise, in the payment phase, users encountered better experiences, declaring as possible opportunities for improvement the option to accept separate terms and conditions. Finally, in the scheduling of the service, the biggest UX problems were detected: the fall of the page and the non-confirmation of the data of the older adult (senior) who will deliver the service. All these problems represent usability barriers (Portz et al., 2019); overcoming them would make older adults more willing to use these technologies (Gopal & Murale, 2018)

3.1.4. Analysis of Information Architecture

A content audit (gathering of information) was made from the information (textual and graphic) that the ServiSenior website managed. It was considered relevant to review the information architecture on the website since the ease of access and findability of the content is directly related to the experience offered to the user. However, the results obtained indicate that, in information architecture, one of the most outstanding problems on the ServiSenior website is the content, since much of the information was difficult for users to find. The contents need to be organized on the basis of people's mental models so that they are easy to find; for this, it is key to create sitemaps based on the card sorting technique.

The creation of sitemaps (diagrams of the pages of the composition of the website) is recommended, as it will facilitate navigation within it. Hence the importance of creating them from the UCD, since they are structures that arise as a proposal from the users themselves, through the ordering that they carry out of the content, grouping and prioritizing them according to the logic defined by their mental models. These criteria ensure that the content is in places accessible to people, in particular to seniors. For this purpose, 10 users are tested with the profiles of clients and the elderly, asking them to order the cards delivered with the concepts or sections defined on the website, achieving the distribution that can be seen in the new sitemap (Figure 3).

3.1.5. Design of the Sitemap

From the results obtained after the application of the card sorting technique, the sitemap was built, taking as a premise those cards or concepts that appeared grouped in the same category greater than 50% of the time (Ferrer-Mavárez et al., 2020). For the main categories, the following sections of the website were used: Log In, Senior Application, Request Service, Company, About Us, and Help. All the cards or concepts evaluated met the frequency criteria of greater than 50% placement in the same category. However, only the Recognition card obtained 40%, so it was decided to place it in the category where the user ordered it the most (Figure 3).

3.1.6. Comparative Analysis

From the application of the benchmark technique, the analysis of the state of the art was carried out, relating the digital products similar to the ServiSenior website, nationally and internationally. To do this, three of the job portals and service offerings with related and similar characteristics were explored: ALBA (https://albaapp.com), TUTEN (https://www.zendesk.es), and Uber (https://www.uber.com/cl/es). The analysis was based on the positive and negative aspects of the fundamental elements in the designs based on UX.

According to the results, it was possible to propose good practices (correct decisions of UXs) for the redesign of the ServiSenior website, following the respective analyses in Figure 4.

Finally, the preliminary results of the Benchmark analysis, allow us to mention that it is necessary to adopt solutions that meet the needs referred to by all the groups evaluated (previously explained), as well as the review carried out on the other platforms, to ensure optimal operation, in the process of interaction with users.

3.2. Design Phase

Starting from the investigative work and before designing a graphic proposal, the moodboards of the project

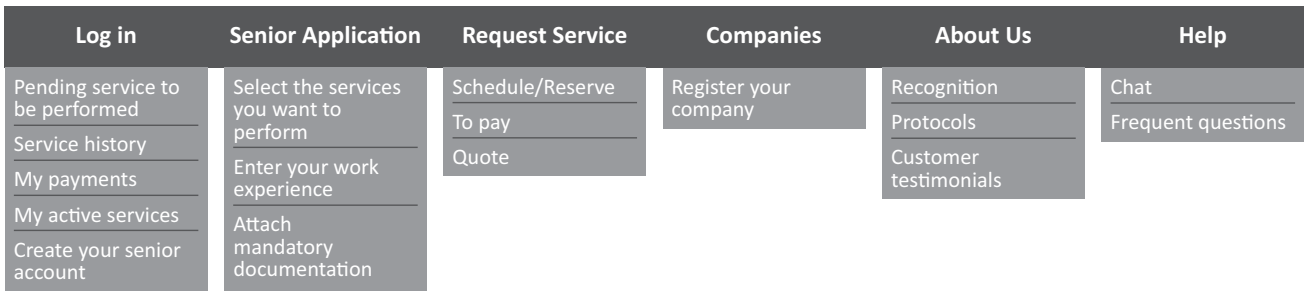

Figure 3. Sitemap for the redesign of the website.

ALBA

Considering the company ALBA, it was proposed to incorporate the display of the candidate's profile before requesting a service, in view of the fact that, on the ServiSenior platform, clients paid for the service without knowing the profile of the candidates. Therefore, the client only accessed the data of the assigned senior, ignoring the other possible candidates.

TUTEN

Considering the company TUTEN, it was suggested that is should detail what each service offered includes ServiSenior in view of the fact that, the ServiSenior platform did not offer detailed information of the service to be offered. Therefore, the client was unware of the scope and details of the service. Also, it was considered important to incorporate the client dashboard (user interface of dashboard with a summary of the user profile and associated services), in view of the fact that on the ServiSenior platform, clients could insufficiently see the protocols of the services offered.

UBER

Considering the company Uber, the loyalty of clients and driving partners is prioritized, an aspect that is essential. In ServiSenior, a renewal methodology was applied with the same senior; however, it was confusing and unclear with the older adult (senior), since he did not receive any notification to his dashboard, like the clients.

Figure 4. Results of the benchmark technique.

were created, which are defined as inspirational canvases or trend panels, elaborated collaboratively by the design team, through images and visual references, which eventually evolved into the visual style guide of the digital product (Ritter & Winterbottom, 2017). They were based on composition and collage, with the aim of transmitting the concepts that are related to the ServiSenior brand, based on user feedback. Two moodboards (Figure 5) were built.

Subsequently, the RAT was applied to test the moodboards, with the purpose of measuring the fundamental creative features of the website according to the remembrance of the users, and, likewise, evaluate their evocation with the concepts to be communicated (Nielsen & Thurber, 2016; Toivainen et al., 2019). It was applied to 14 people (three collaborators, seven clients, and four seniors), asking them to express their perception of the moodboard designs, through three words that encompass or connect their perception. The results showed that Moodboard 1 should be the one selected, taking into account the decisions of the majority due to empathy, usefulness, and understandability of the project concept and the identity image of the brand. These results were considered for the construction of the concept in the graphical UI of ServiSenior.

3.3. Prototyping Phase

Considering the results of the application of research techniques and taking user feedback as a reference, the prototyping process began. It is defined as the creation of different scales of the design product, from the initial ideas (low prototype) to the refined and interactive graphic proposal (high prototype; Ferrer-Mavárez et al., 2020; Ritter & Winterbottom, 2017).

The prototypes were created based on the design decisions detailed in Table 3, which evolved as they were tested with users (Pinilla Gamboa, 2014). For the evolutionary process of the prototypes—low, medium, and advanced—what is proposed by Buxton (2010) and Rudd et al. (1996) is considered. It starts with the creation of the wireframes, initially represented by a skeleton where the most important elements of the UI are organized: search engine, menu, and content. Next, graphic elements, such as color, typography, and images, were incorporated into the initial skeleton, based on the

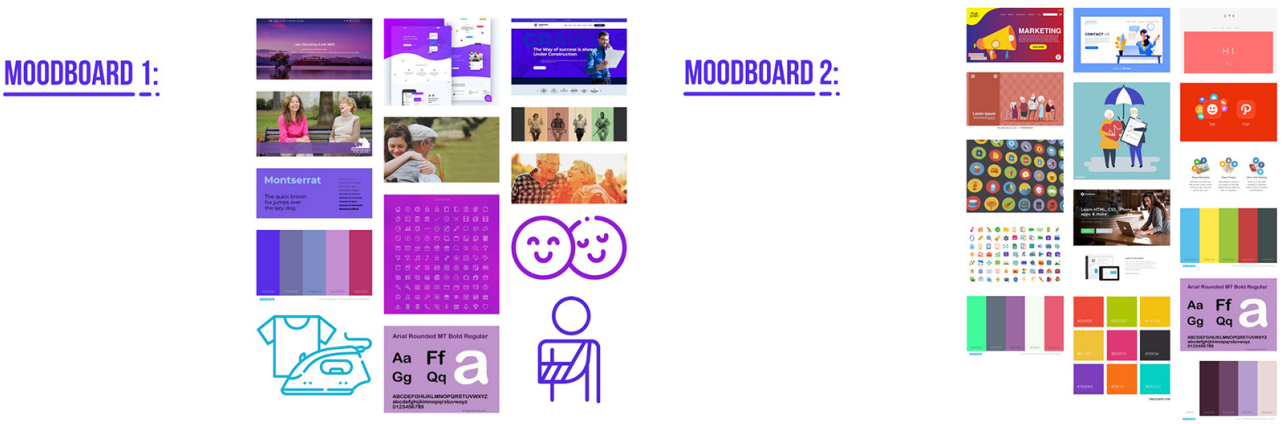

Figure 5. Proposed moodboards.

Table 3. Comparative analysis of the characteristics of the initial web portal and the redesign proposal.

Techniques	Characteristics of the initial web	Redesign proposal
Focus Group	The platform should improve the usability	Easy, intuitive, and simplified UI design
Survey	The architecture of information should be better, to optimize the findability of the contents	Site map proposed by the User-Centered Design
Method HUMULU Proto-persons	The users require simplification of the application process	Friendly and intuitive tool, with a notification system for job offers
User journey map	Difficulty finding service information	Simplify service information; the architecture of information of easy localization to the different services
	Information that does not correspond to the contracted service	Explanation of the contracted services
	Mandatory fields not identified	Identification of the mandatory text fields in the forms
	The non-confirmation of the data of the senior who will deliver the service	UI with confirmation data of the assigned senior
	The calls to action are not clear	Highlight and rank the calls to action.
Card sorting	Requires the application of the card sorting technique	Content distribution to ensure content findability
Benchmarking	Clarity of content organization	Quality of the contents
	Simple design and navigation	More user-friendly UI dashboard
	Responsive design	The UI will be accessible to multiple devices

information collected by the moodboard selected by the users, generating a more refined prototype: mockups. Subsequently, the prototypes are tested with the different groups of users, to verify the experience and find out if the proposal was coherent with the organization of the elements that were displayed and allowed an intuitive interface, with easy-to-find content and legible typography. The results of the applied tests are detailed below.

3.4. Testing Phase

The final prototype was subjected to a heuristic evaluation, a usability inspection method without users that consists of examining the quality of use of an interface by several expert evaluators, based on compliance with recognized usability criteria, called heuristic principles (Molich & Nielsen, 1990). The objective of this evaluation was to detect potential problems and solve them. Two UX experts participated in the evaluation and the results affected the prototype design stage: adjust icon size to improve readability, occupy the corporate color coherently, rank the information in terms of primary and secondary texts, incorporate breadcrumbs, and more intuitive information architecture.

To complement the heuristic evaluation technique, the usability test was applied. The objective of the usability test is to know in detail the ease of use of a product or service and the level of effectiveness, efficiency, and satisfaction that it generates in the user. It was applied to 10 users (five clients and five older adults), through "lookback" software that allows testing versions of prototypes to know the tasks carried out and those not carried out by the users. A user interaction link with the prototype was sent, where they were asked to perform some tasks, which were performed with different levels of effectiveness.

The results of the usability test allow us to verify that there are opportunities for improvement, such as:

- On the home page, greater visibility to the range of services offered by the platform;
- Buttons at the top of the pages, without the need for them to be seen after the scroll or vertical displacement;
- Refine the information throughout the website so that it is not clear and precise.

Finally, the last test of the prototype, heat map, was applied, occupying the optimal workshop platform which corresponds to a graphic representation in which the matrix of a large mass of data is shown with colors that serve as informative elements to verify if the site is understandable to use since it identifies the elements that attract or not clicks. This test was carried out on 11 users of the customer profile, whose instruction consisted of

a simple order to the user to execute with one click, to perform three tasks: (a) request a service for the first time, (b) renew a service, and (c) login. The test was carried out at the following link: https://cw4kvwi8.optimalworkshop.com/chalkmark/0j3r358p. The synthesis of the results of the test of the heat map is detailed in Figure 6.

4. Discussions

The purpose of this study was to redesign a web portal, oriented towards communication and labor management for older adults, from the perspective of UX. The selected web portal was ServiSenior, a case study that contributed to this research due to: (a) its inclusive commitment, focused on the elderly population in Chile, and (b) its promotion of the development of flexible job opportunities for older adults offered online. In response to this, the application of UX tools for the redesign of this web portal allowed the process of adapting the existing one to the requirements and needs of the group of older adults. With the investigation, it was possible to verify that the UX methodology allows providing a pleasant experience through ease of use and access, to vulnerable social groups, especially the elderly, considering effective communication as a relevant factor in the main activity that older adults do in digital media (Nordin et al., 2022), achieving employability goals for this population through the ServiSenior website.

The UX model made it possible to define website design criteria, adapted to the characteristics and needs of people (Pretel-Jiménez et al., 2022), in response to the physical limitations of aging, as stated by Gopal and Murale (2018), Huang et al. (2017), Wildenbos et al. (2018), and the World Health Organization (2015). The redesign of this type of platform allows older adults to fully participate in the activities of society mediated by technology, which positively affects their physical and emotional well-being, improving their quality of life, according to Dekker-van Weering et al. (2017), Portz et al. (2019), and Rojas et al. (2022). The application of this methodology provides a timely response to future research involving older adults, with a focus on the needs and timely solutions (Nordin et al., 2022).

The different techniques of the UX model yielded data that made it possible to define the redesign of ServiSenior (Table 3), based on relevant criteria for the development of communication and employability products focused on older adults, replicable for other vulnerable populations, such as people with disabilities, or the general public. Therefore, the UX methodology represents an ideal model to know in depth about the characteristics of particular populations, which allows for designing or redesigning technological solutions aimed at the efficient use of ICT, guaranteeing their successful integration into daily life.

5. Conclusions

In response to the fulfillment of the objective of this research, aimed at redesigning a web platform for employment and services (ServiSenior), defining design guidelines that provide inclusive UX for older adults, based on UX research techniques, the following conclusions are presented.

The UX methodology approach allowed the construction of research guidelines, testing, measurement of experiences, and the creation of a sequence of prototypes to iterate and redesign each stage of the website based on UCD.

The UX methodology allowed a broader and more global understanding of the project, aligning efforts in a coordinated manner and helping to define the product in the initial phases, which quickly expanded the transmission of knowledge to the work team, allowing to reduce the time.

The results of this research allowed the design of a prototype for the creation of an easy-to-use web

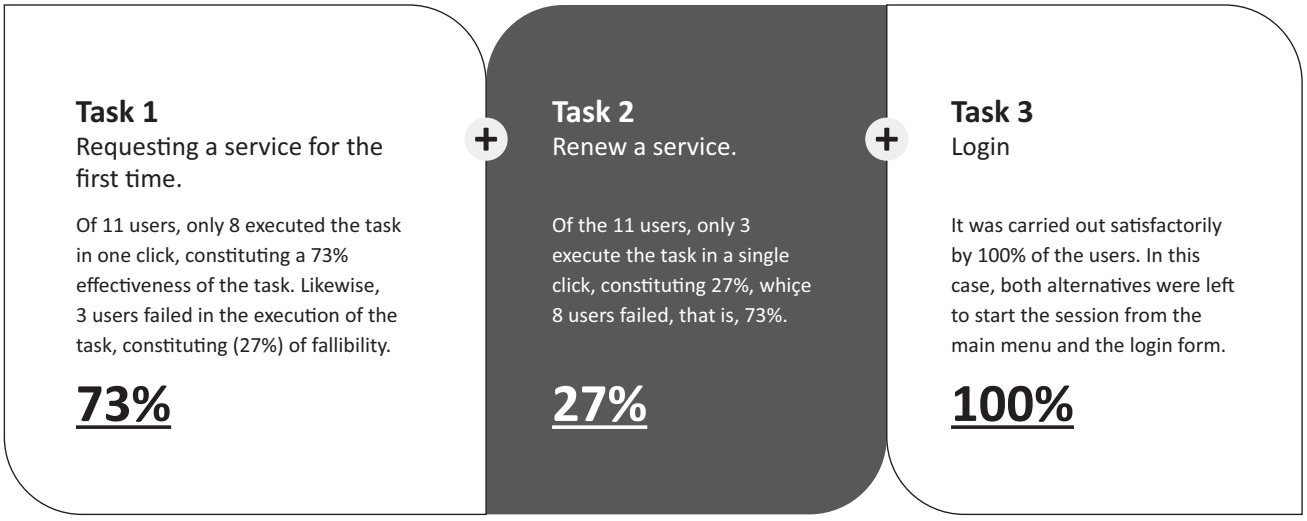

Figure 6. Results of the test of the heat map.

platform, focused on the elderly. The importance of involving users in the construction of the product was evidenced from the beginning of the creation of the digital project, which allowed (a) knowing the needs of the target audience, (b) knowing the different visions of the company's work team, (c) efficiency and optimization of design time, (d) iterating and refining the prototypes to generate better design results, and (e) establishing more accurate methods and processes for the creation of the design and development of inclusive digital products.

The UX methodology made it possible to mitigate the uncertainty of creating a design product without feasibility techniques from data collection and throughout the creative process. The relevance of the co-creation of the final product with the active participation of the target audience is highlighted, based on continuous testing in each phase from a measurable perspective for its refinement, improvement and effectiveness.

In attention to the prospective in future projects, it can be highlighted that the UX methodology proves the importance of involving users, due to several important aspects: (a1) Technology is changing as well as its languages; (b) users experience psychological, motor, and perception changes as the years progress; (c) there is always the opportunity to learn new technological alphabets; (d) the use and access to technology allows us to approach new realities and possibilities, both work and connection with people.

Regarding employment portals and their importance to universal access, it is proposed to promote research based on the UX methodology, which involves older adults and production and design units working as a team and developing products that serve to insert this vulnerable population in workplaces. This will help the design to be developed with greater criteria of universality and adaptability, strengthening the right of use and access of human beings to the use of digital technology.

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Conflict of Interests

The authors declare no conflict of interests.

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