

Project Management Report

Usability & User Experience 2020/2021

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Introduction

In this document we present our design proposal to Register.it, an Italian company operating in the sector of providing domain registration, hosting, brand protection and online advertising services. Among all the services they offered, we focused on those regarding **domain registration, hosting and website management**. So we can say that the application task we have decided to focus this work on is to use a hosting service, in particular the management of the domain, therefore from the point of view of the web space (e.g. uploading files) but also from the point of view of ancillary activities (e.g. changing owner of the domain, managing renewal, negotiation etc.). Being a company that offers very different services, Register has a very varied range of users from an ethnological point of view. We have decided to focus on a target group of users that globally covers **55-75 years old with no IT previously acquired knowledge, but at least generally aware of the Web and the digital technologies** ([1. Ethnographic Research](#)). In particular, we have focused on those people who would be interested in registering a domain in order to have a personal website **for their business, but who are generally held back from doing so because they perceive the task as too complex, and beyond their capabilities**.

Eventually, we evaluated the system and its main competitor through an **expert usability review and a user testing** ([2. Assessment of Existing Resources](#)). For what concerns the former, we have chosen two different heuristics guidelines to inspect the system through a direct analysis and a reverse one. About the latter, after defining a testing protocol and method, we presented the tests summary carried out on three different users, each of them belonging to the global range of users we have focused on. We analysed the results of the test, considering both subjective and objective data. The errors detected in the expert usability review and those detected in the user testing were then merged and grouped under specific error categories that have been defined on the basis of frequency, impact and persistence; and then graphically represented in an urgency curve.

While these first two parts of the document are mainly analytic, i.e., concerning the analysis of existing resources and users' opinions, the second part of this report could be considered as synthetic, as regards a proposal to create a prototype of a system that can not only simplify the task but also modify the users' perception of the difficulty of the task. In other words: it is not enough to simplify a part of the system - maintaining its consistency and consistency with the rest of the system - for it to be perceived as simpler by users. For this reason, we have redesigned both the technical and functional components of the system and those concerning the appearance of the system itself, therefore the design and aesthetics. To do so, we started from [3. Feasibility Study](#), where we firstly identified **context of use, intended users, intended tasks and technical, cultural and environmental constraints**. Afterwards we designed scenarios and personas to better identify the goals and the needs of possible users and how it is possible for them to realize them through the completion of one or more tasks on our proposal system.

The second step in the realization of our prototype has been the [4. Design Proposal](#), defined through the analysis of the **information architecture** of the current system followed by our proposed change in the main components of the latter. Then, starting from the definition of the information ecology of the system - thus the context, content and user definition - we analyzed and described the components of the existing system followed by the description of the components of our prototype system, according to a top-down model. The goal-oriented design method we have chosen to adopt finally came

up through the **CAO=S model**, where concepts, actors and operations led to the definition of the structures that make up the existing system and the prototype. The design of a system of this type inevitably involves the design of the **interaction between** the user and the system: the dialogue, the conceptual model and the structure of the website, the use of naming conventions and handling errors. After defining these aspects, and above all the structure of the site and the functionalities and the navigation components, the natural step was to define the **blueprint** of the system. We then created the **wireframes** of the prototype, keeping in mind the blueprint, which was used to define in the wireframes which elements of the page navigation and what type were needed to complete the main tasks on which we concentrated our work.

Finally, as we inspected and evaluated the existing system, we also **evaluated our system, both internally** (cognitive walkthroughs, action analysis and heuristic analysis) and **externally** (user testing) - [5. Evaluation of Design](#). The results of these outcomes lead us to improve one last time our prototype.

The results of the evaluations, especially of the external one, have been reported in [6. Conclusions and Final Recommendations](#), together with the objectives that have been achieved and the possible further developments of the system, especially from the point of view of design and usability.

1. Ethnographic Research

With "Ethnographic research" we define a qualitative method largely used in Anthropology and based on researchers' direct observation and potential interaction with their study's participants, in their real environment. The ethnographic research helps to understand the target users and detect a segment which is not currently responding, i.e. our focus target. Because of the high specificity of the domain of the application task, the first general target audience that we selected are people not acquainted with informatics and use the web in a superficial way. Generally speaking, they are between the ages of 55 and 75 years old.

We chose this group because its members represent the potential user who is most unlikely to interact with this service, albeit encountering complications due to a counterintuitive interface and to the structure of the site.

Therefore, these users are led by necessity to prefer competitor hosting services which allow them to complete the predefined task in a smoother and more efficient way.

1.1 Segmentation of the target

The members belonging to the target group are united by many demographic, cultural, social and economical aspects, and also by the common aim of expanding their own pre-existing business or advertising and selling their hand-made product online. In particular, the aspects which characterize our target group's members are:

- a. Having an hobby, a family-run activity or a specific production to be promoted online, with a specifically dedicated website;
- b. Being born in the period ranging from the post-bellic years to the 60s economic boom;
- c. Having a middle-low educational level, either because of specific constraints or diverging interests;
- d. Being totally or predominantly unfamiliar with the IT, in particular with the web development domain

However, since this target group covers a variegated audience, it was useful for the present study to segment it on the basis of some main factors, i.e.:

- a. Personal scopes and necessities motivating the will of developing and maintaining a dedicated website with specific characteristics;
- b. Educational level and type of education (formal, informal such man to man knowledge passage)
- c. Historical and sociocultural aspects related to the period of birth;
- d. Limits and possibilities related to their computer knowledge mastery, i.e.: their level of independence in a website creation and maintenance.

Further, each demographic segmentation is presented below with a correlated psychological partition based on various factors, among which attitudes, values, interests. The main factor we chose for the segmentation is the relation toward the working phase the target user is currently living, and the way in which it can impact the user's attitude toward her own e-commerce.

Psychological Segmentation	Hypothetical and Consequent
-----------------------------------	------------------------------------

(personality, values, attitudes, interests...)	Demographic Segmentation (age range, education, income...)
<p>Middle-aged resilient and proactive workers, looking for new ways to promote their products and services.</p> <p>They see e-commerce as a real possibility to increase their ongoing business and they conceive it as a part of their professional life. The members of this group are generally careful and slightly suspicious when it comes to their professional activities, so they highly value clear offers over eye-catching ads. They prefer to manage their business on their own, so they may want to take part in the development of the infrastructure of their website, even if they generally don't have time to learn from scratch how to develop it. For this reason, they could ask for the help of trusted people, such as close friends they exmate or their own relatives. In choosing a platform for the management of their online service, they would value the ones guaranteeing clarity, security and reasonably convenient offers.</p>	<p>Middle-aged independent workers, willing to promote their own activities. They were strongly impacted by the 2008 economic crisis, which came at the edge of their careers. Indeed, while making them more disenchanted toward the traditionally conceived employment world, this social milestone also forced them to develop new creative ideas and transversal skills to keep up with a changing economic environment.</p> <p>Most of the people belonging to this segment completed the first levels of instruction in a cultural context of consolidated broad schooling, and they generally didn't get a degree because they were not interested in it, and not because of economic constraints. In most cases, they chose their own activities for a matter of passion and not only for familiar constraints and necessities.</p>
<p>People at the end of their careers, either looking at a fresh and less demanding way to keep carrying on their activities after retirement or looking for a totally new activity to promote online to keep them productive as they will have stopped working.</p> <p>The members of this group may want a website for the sale of some products or goods they are specialized in, either related to their working experience at sunset, or to some extra activity they eventually have the time to cultivate after retirement and they are particularly proud of. Online sales are generally not motivated by financial constraints, but may be seen more as a hobby or as a way to raise money for social/ charitable purposes which could give a deeper value to their activities.</p> <p>The people who belong to this group get to know the IT world mainly by surfing online and using social networks. They are not experts and they may be confused about the hidden mechanisms of the website's infrastructures, however, they generally are independent users. In case</p>	<p>Late-middle-aged workers, freshly retired or on the verge of retirement. The activities they want to promote are generally either related to some aspects of their jobs they want to keep investing in after retirement, or to some extra hobbies they have been cultivating over the years. They were directly affected by the economic crisis, although in a less crucial phase of their career.</p> <p>Being born in the golden years of the demographic boom, they represent one of the core segments of the population who could access a broad schooling, and most of them had the opportunity to choose for their own career path. However, their familiar constraints and necessities still had an impact on their work choices, such as deciding to bring on a family-run well established business. They value artisanship over serial productions, but they also have an eye for convenience and saving.</p>

<p>they want to develop a website, they either may use a framework which does not imply the use of code, such as WordPress or Wix, or they may need some help from someone who is pretty acquainted with the field. The most enterprising members of this group may also want to learn how to develop a website on their own in their free time, maybe following some youtube tutorial suggested by their relatives or more expert friends, as long as it is efficient and not too time consuming. They generally get annoyed by all the activities that they do not conceive as useful or at least entertaining. For this reason, most of them would follow a tutorial just as long as it is self-concluding and really effective, otherwise they would probably prefer other solutions.</p>	
<p>Hobby/passion online promoters and ex-workers willing to prosecute the production and sale of some particular items they had been producing during their career.</p> <p>To this group belong both those who aim at obtaining and maintaining a website where to promote and sell the products they make in their spare time and those who want to keep selling the products they had been producing during their careers, even after the conclusion of their activity period in a physical marketplace. The opportunity of selling online in the years of retirement is seen as an useful extra or as a matter of passion, and it is not motivated by financial constraints.</p> <p>The IT knowledge level is quite low, since the members of this group didn't receive a formal education concerning this field, but - at the same time - they like to spend their free time surfing online. Further, while their little social network knowledge helps them to get oriented in the online scenarios, the amount of free time they have after retirement allows the ones of them who are willing to get new skills to get to know some basic concepts about Web Development. However, they can't be seen as independent in the management of a website. For this reason, their online sale activity is frequently mediated by their children, nephews or grand-children. They highly appreciate simplicity, clearness and</p>	<p>(Freshly) retired people, willing to promote their extra activities and artisanal products. In some cases, they may want to prosecute their life-long family-run business, getting specialized on the production and online distribution of one or few specific products.</p> <p>They were affected by the economic crisis, although in a less crucial phase of their career: this circumstance made them less needy and, consequently, less prone to innovation. They highly value artisanal products over serially produced items, since they have clear references and memories of an historical period in which the most of the products were hand-made.</p> <p>Some of them had to interrupt their studies in order to run the family business or go to work after the end of primary or middle school. For this reason, the majority of them are positively stimulated by the possibility of learning new skills and cultural concepts in their spare time.</p>

<p>explicability and feel slightly annoyed by the activities they don't feel they are able to take part in because of their poor domain knowledge.</p>	
<p>Hobbies, Passions and Artisanship online promoters with no working constraints any more.</p> <p>This group includes all those who aim at obtaining and maintaining a website where to promote and hypothetically sell the products they make in their spare time. The possibility of selling online the items they craft or produce is mainly an accessory: the activity is neither motivated by economic necessity nor conceived as the primary means of distribution. The conception of the group related to the utility of starting an online business or advertisement was incentivated by the pandemic of the last couple of years, since before it they were used to sell and advertise their products through other circuits, such as word-of-mouth.</p> <p>Their knowledge of IT is really limited and in the majority of cases they not only had no formation in the web development field, but they also have a really limited knowledge of the online services in general. Consequently, the independence level in the creation and maintenance of their web site is really low: they need someone to help them both in the creation phase and in the subsequent updates.</p> <p>They highly value the opportunity of being involved in the whole process of their business and they easily get discouraged when their educational level constitutes an obstacle to their full comprehension.</p>	<p>Long-time retired workers, mainly promoting hand-made items, which in most cases are the fruits of an hereditary art and craft knowledge passed from man to man. They were born in the immediate post bellic years and most of them experienced economical restrictions in their childhood. This circumstance makes them particularly appreciate well crafted durable artifacts, and home-made food and products.</p> <p>Their cultural level is generally humble, since the average person born in the post-bellic years had to prematurely interrupt her education. Because of their socio-historical background, they generally value the possibility of passing on their traditions more than learning new skills, for example related to the evolving production scenario.</p>

1.2 User research

User research has the scope of understanding user behaviors, needs, and motivations through **market research**, a **contextual inquiry** and a **task analysis**.

We conducted the user research through both indirect and direct sources of data: the **reviews on the TrustPilot, HostAdvice and Website Planet websites**; a **survey** and an **interview**. In the **task analysis** section we identified the context of the product's usage, thus the sequence of steps and user interaction between the space covered by the app and other tools, events or activities external to the tool.

1.2.1 Market research methods: the reviews

As indirect sources of data collection we chose to consider reviews in TrustPilot, HostAdvice and Website Planet. Among the negative reviews about Register, we have focused on those concerning the perceived difficulties in using the service and on the related user experience.

TRUFFATORI E INGANNEVOLI

 Servizio usato: Condiviso - Hosting Smart

selezionato il metodo di pagamento dal loro portale su "MANUALE" che cito:

"Rinnovo 'Manuale':

Alla scadenza i domini e i servizi non rinnovati saranno cancellati."

Ebbene dopo 6 mesi sono stati addebitati non 30, ma bensì 60 euro sul conto perchè sorpresa: erano ben 2 email, tutto a mia insaputa.

-poco prima ricevuta anche una seconda email che mi avvisa che un non meglio definito "abbonamento" sta per scadere, per un totale di 3 servizi nonostante ne avessi chiesto uno.

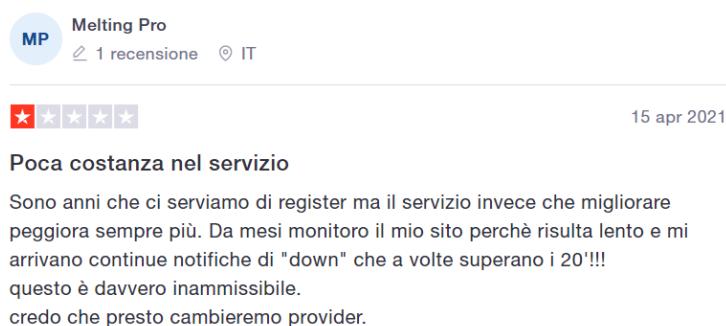
provato a contattare l' assistenza: 98 centesimi al minuto di costo della telefonata. dopo 4 minuti di attesa è caduta la linea.

-il sito è ingannevole e strutta tecniche comunicative per guidarti all' acquisto e rendere difficile individuare identità dei servizi, costi reali e come disattivarli.

I' email in se? I' ho provata, è basata su un sistema di gestione webmail usato anche da altre aziende, che funziona malissimo. probabilmente è una piattaforma standard personalizzabile, di bassissimo valore tecnico.

-SCONSIGLIO VIVAMENTE DI AVERE A CHE FARE CON QUESTI TRUFFATORI!
[Meno](#) ▲

Figure 1. TrustPilot review of Register about the lack of the application, lack of clarity regarding subscription plans and renewals, and misleading information that confuses the user.



Melting Pro
 1 recensione IT

 15 apr 2021

Poca costanza nel servizio

Sono anni che ci serviamo di register ma il servizio invece che migliorare peggiora sempre più. Da mesi monitoro il mio sito perchè risulta lento e mi arrivano continue notifiche di "down" che a volte superano i 20!!! questo è davvero inammissibile.
credo che presto cambieremo provider.

Figure 2. TrustPilot review of Register about lack of consistency in the service offered and the low quality of the service itself.

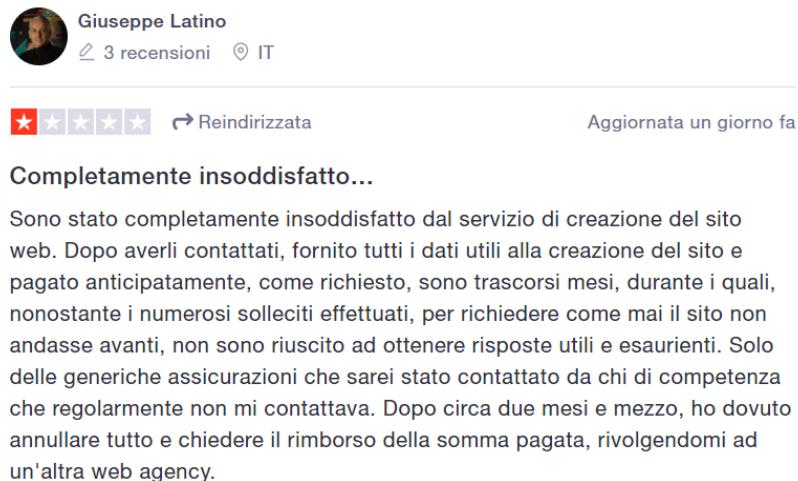


Figure 3. TrustPilot review of Register about problems with assistance with creating and activating a website.

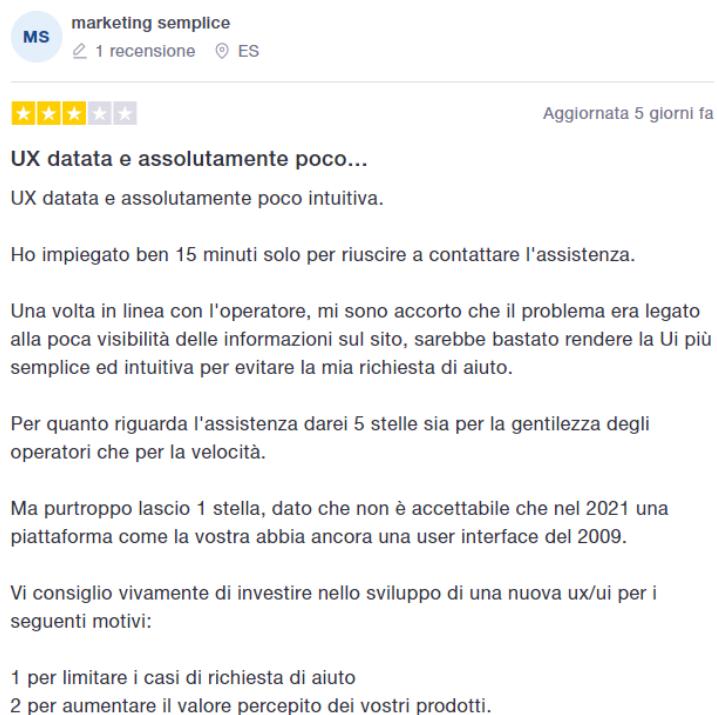


Figure 4. TrustPilot review of Register about dated UX that prevents the user from completing a task and enhancing the service.

 cliente
CL 2 recensioni IT

 Aggiornata il 3 mag 2021

Impropriamente “gratis”

I servizi offerti come gratis nascondono costi che devono essere sostenuti in caso di mancato rinnovo a pagamento.

Ho scelto di provare il prodotto Pec Agile Gratis. Alla scadenza del periodo “gratuito” ho deciso di non rinnovare la casella pec e di disattivare tutto. A sorpresa mi sono stati addebitati i costi di € 9,90 + iva per servizi di set up. Mi è stato spiegato che i costi di set up si sostengono in caso di mancato rinnovo del servizio dopo il periodo di prova.

Tali costi sarebbero indicati da sempre nella pagina del prodotto (sinceramente al momento dell’attivazione non mi ricordo di averlo letto) e nelle mail di avviso di prossima scadenza si omette il costo obbligatorio per il servizio gratis.

Credo che il termine “gratis” sia utilizzato impropriamente.... piuttosto sarebbe più onesto parlare di periodo di prova (a pagamento). 😊

Aggiornamento: contemporaneamente alla presente recensione ho fatto richiesta di rimborso per le somme addebitate per i servizi di set up. La richiesta di rimborso è stata subito accolta e sono in attesa di ricevere l'accrédito. Tutto bene quel che finisce bene.

Resto però dell'idea che il termine “gratis” debba essere utilizzato senza costi occulti, evitando di addebitare importi che poi si rimborsano alla prima richiesta.

Figure 5. TrustPilot review of Register about the lack of clarity regarding the cost of the services offered.

 Sara Ambrosi
1 recensione IT

 Aggiornata il 7 apr 2021

Non mi sono trovata niente bene

Non mi sono trovata niente bene

Ho pagato troppo per lo scarso servizio e non mi sono stati d'aiuto

Sito poco intuitivo in caso di disattivazione

Brutta esperienza

Vorrei chiudere la pagina e non ricevere più le vostre insistenti mail

Da sola non riesco a chiudere da voi non è molto intuitivo come quando si compra. Perfavore non voglio piu i vostri contatti cosa devo fare?

Figure 6. TrustPilot review of Register about the lack of clarity, the missing assistance and not very intuitive interface.

 **RECENSIONI DEGLI UTENTI** 

Lingua Italiano x  Ordina per Più recente  

 **anonymous**  17 Giugno 2021

Per amore di dio

Prima funzionava ma da un po' di tempo va tutto storto, non funziona nulla e se per caso vi serve l'assistenza, fatevi il segno della croce. Il sito rimane down per giorni prima che rispondano e risolvano il problema. Pessimo. Assolutamente sconsigliato anche perché molto più caro rispetto ad altri della stessa qualità.

 [Rispondi](#) 

 **Teresa**  19 Aprile 2021

non efficente

Purtroppo nonostante mille tentativi, e Server virtuale dedicato, il sito caricato sui loro server non gira. Siamo stati costretti a migrare su nuovo hosting, che già su basic condiviso gira bene. Mannaggia. Spero almeno in un buon rimborso.

Figure 7. Website Planet reviews of Register about low quality of services offered and the problems with the assistance.

 **anonymus**  Italia  1
29 Maggio 2020

Il peggiore mai visto in vita mia

Praticamente il servizio hosting base è impraticabile. Timeout in continuazione durante il processo di lavorazione con wordpress, quindi utente unico. non sono riuscito neanche a creare un pacchetto per migrare. mi è toccato trasferire tramite ftp

 [Rispondi](#)

[Visita Register.it](#)

 **Massimo C.**  Italia  3
24 Aprile 2020

Servizio di server buono - assistenza pessima

Il Servizio di server cloud è buono ed efficiente, però per la gestione del pannello di controllo è dei rinnovi occorre richiedere l'assistenza tecnica. Nonostante che l'assistenza dedicata Premium si paga a parte, si ha a che fare un assistenza pessima che ti risponde con tono di arrogante e supponete e che invece di guidarti in remoto ti indirizza sull'homepage con aggiunta di incomprensibili termini tecnici in inglese.

 [Rispondi](#)

[Visita Register.it](#)

Figure 8. Website Planet reviews of Register about low quality of hosting service and problems with assistance.

⬇️ REGISTER.IT RECENSIONE: CONCLUSIONE

Register.it offre piani con caratteristiche che dovrebbero risultare più che sufficienti per la gestione di qualsiasi cosa tu possa avere in mente di creare. Tuttavia, se il tuo sito cresce più rapidamente del tuo livello di hosting, l'offerta Elastic Hosting ti fornisce copertura con degli upgrade temporanei gratuiti del piano.

Pro

- Dominio gratuito (un anno)
- Elastic Hosting
- Auto-installer Softaculous
- Hosting basato su Windows o Linux

Contro

- Supporto non 24/7
- Servizio non adatto ai principianti

Figure 9. Website Planet summary of Register: the cons are those we want to focus on.



Figure 10. Website Planet comparison of Register with its competitors.

Reading these reviews, the main problems that emerge are:

1. Weak assistance service;
2. Unclear control panel structure and resulting confusion about the actions the included buttons lead to;
3. Poor quality of the website provided by Register service (bad User Interface, leading to a poor User experience);
4. Inadequate communication between service providers and users (lack of clarity about the nature of the free services offered and in the definition of the related deadlines, after which they become paid);
5. Service non suitable for inexperienced users.

1.2.2 Contextual inquiry: the interview

The purpose of the contextual inquiry with an interview is to obtain direct information from the interaction with the interviewee, thus to be told in detail his or her experience with domain registration and hosting services. Indeed, differently from the survey, this phase is based more on open questions than closed ones, so to **deepen some research aspects with few, selected interviewees relevant for our segmentation of target audience.**

Selected interviewees are:

User, age	Hobby / Activity / Business	User Testing
Renato, 69	Arts and Craft: Renato repairs household electronic equipment and small personal tech-devices. He consolidated the client base of his shop in Bologna over an activity period of almost 45 years, and now he would like to move part of his activities online, both to repair at his own place the objects people may send to him and to sell online his products crafted by hand.	Initial, on the website chosen for the project

Anna, 63	Artistic Gardening: Anna wants to sell the seeds of the many various plants she has been growing for years in her own garden and garden houses, as well as gift-packed plants and her hand made creative gardening accessories, such as decorative items and her special sprout pencils.	Initial, on the website chosen for the project
Massimo, 59	Cooking and recipes : Massimo sells zero-kilometer ingredients in gift boxes and would like to have a website where to share his video tutorials on how to assemble the various elements he sells in delicious recipes. One of his lead products is the pizza gift box, containing his certified flour, yeast, salt, flavorings, olive oil, and home-made tomato sauce).	Initial, on the website chosen for the project
Cristiana, 55	DIY and crafting for childhood: Cristiana is a primary school teacher with 32 years of experience who would like a site to sell the crafts made with children at school and a small instruction book to reproduce the crafts (recommended for other teachers, babysitters, educators). She needs to advertise products to fund extra activities for the primary school she works at.	Final, on the wireframe we designed for our proposal
Sergio, 60	Photography: he is in the last years of his career, and after a life spent for his job he now wants to cultivate his passion for photography. Sergio enjoys editing pictures at an amateur level, he customizes photo books for his friends and family, makes videos out of pictures and realizes photoshootings for his acquaintances at special events.	Final, on the wireframe we designed for our proposal
Pablo, 57	Cocktail bar: Pablo sells self-produced certified spirits and brandies, custom shakers and bartender accessories with his bar logo. Each of his products is unique and he retains his client base with products' quality, reasonable prices and his great personality.	Final, on the wireframe we designed for our proposal

The interview was divided into **4 main sections**:

1. The first concerns the **collection of personal information on the interviewee**: age, educational background, experience and knowledge in this precise field of information technology;
2. The second section consists of **questions regarding the use of hosting and domain registration services**;
3. The third section concerns **Register.it**, so if the interviewee has ever used it, if he evaluates it positively or negatively motivating the answer, **how many times** he has used it and **for what purposes**, and in general what is his or her experience with this company;

4. The last section consists of a sort of **guided scenario**: the interviewee is invited to visit the Register site, and then the interviewee is **asked for an evaluation on the use of the service** with some questions, for example: How does the site look to you? Is it easily navigable? Is the overall structure intuitive? Is there any other observation you would like to make?

The exact questions asked are listed as follows:

First Section, general questions:

- How old are you?
- What is your level of education?
- Talk about both your educational and working experience.
- What activities do you do with your computer or smartphone?

Second Section, questions on the creation of websites

- Have you ever created a website (from scratch with web languages or with platforms that guide you)?
- If not, if you were to create a website, would you do it yourself or would you get help?

Third Section, questions on the use of domain-registration services and creation of web resources:

- Do you know what a domain for a website is?
- Have you ever used websites for registering a domain?

Fourth Section, questions about Register:

- Do you know what Register.it is or have you ever heard about it before?
- Have you ever used this specific website before?
- Have you ever used Register.it for one of these specific purposes: to register a domain and/or populate a website?
 - If so, how do you rate it? Why this evaluation? How many times have you used it? With what purposes?
 - If not, why? Have you used other Register services? How do you rate the company in general?

Fifth Section, scenario where the interviewee is asked to visit and comment Register.it:

- Which is the first thing that you notice by looking at this website?
- Do you notice some consistent pitfalls on this page?
- What do you think about the services offered?
- Do you have other comments?

The answers provided in the interviews can be summarized as follows:

Interviewee 1: Renato	
Section 1	Renato is 69 years old, he attended a higher technical institute but did not obtain a baccalaureate, so he only has an eighth grade diploma. He worked his whole life as a craftsman, a repairman for household electronic equipment: at first he only repaired televisions, then he began to repair other types of devices as well. The activities he carries out with his smartphone or computer are as follows: sending emails, using instant messaging apps, making video calls, listening to music and watching videos online.

Section 2	He has never created a website, but if he were to do so he would certainly commission the site to someone else, preferably a trusted person, such as a relative or a younger co-worker.
Section 3	He superficially knows what a domain is for a website ("the unique name of the internet address") and he doesn't know sites that offer hosting or website-creation services.
Section 4	He does not know Register and has never heard of it. He has never used this site (and not even one of the competitors) for any service it offers. He has heard of Aruba for its PEC-creation services.
Section 5	Renato immediately understands what kind of services Register.it offers. Overall and for the style he likes the homepage, but he finds it confusing and with too much information, he says that the only service he knows is the PEC. The interviewee's perception of the site is that it is complicated, with too many services that they do not know and that they would not know where to start. However, he appreciates the style of the page he likes, it seems clear to him. [So there is a problem with the organization of the contents, not the graphic aspect itself]. He appreciates that assistance is mentioned right from the homepage. He finds the title "we'll do it for you" reassuring.

Interviewee 2: Anna	
Section 1	Anna is 63 years old and she received her high school diploma, after which she had training in the health sector: she was a nurse and then the head nurse (coordinator). She makes occasional use of the computer, she prefers her smartphone and occasionally the tablet. The activities he carries out on his portable device are as follows: send emails, use social networks, use messaging apps, read news in newspapers and magazines online, shop online, listen to music and watch videos, use home banking services.
Section 2	Anna has never created a website and would ask someone she knows for help if she did. In particular, she would ask someone else to do it for her, giving availability to be present in the creation or making herself available occasionally for some details or steps.
Section 3	She doesn't know what a domain is for a website and she doesn't know web services that offer hosting or website-creation services.
Section 4	She has never heard of Register.it before. She has used a Register competitor for the creation of the PEC but she doesn't know about the other kinds of services offered.
Section 5	Anna's first impression of the homepage is positive, she says it's captivating. She likes the "try it for free" button, she says it makes her want to try. She likes the homepage not only for the style but also because it is complete, there is a lot of information. It is a bit bewildered by animations and more aesthetically excessive things.

Interviewee 3: Massimo

Section 1	Massimo is 59 years old. He has a scientific high school diploma. Then he was trained in the legal field. Now he is an employee at the criminal sector in the court of Bologna. He usually uses the computer and the phone, occasionally the tablet. Specifically, he uses his computer for work, to send emails, make video conferences, make payments and shop online. Instead he uses his cell phone for messaging apps, reading news and using social networks.
Section 2	Massimo has never created a website. If he needs a website, ask someone with the right computer skills for help.
Section 3	Massimo knows what a domain is. He defines it as "the name of the address to find my website". However, he has never used hosting services or bought a domain.
Section 4	Massimo has heard of Register.it, regarding the possibility of purchasing and managing PEC services. He does not know of other services similar to Register.it.
Section 5	Massimo has a positive first impression of Register.it. Appreciate the fact that it offers many useful services. Attracted by the word "free", he is a little wary of it. He wonders if it is just a strategy to get you to buy and that after a while the service becomes expensive with time constraints in case he wants to cancel.

Interviewee 4: Cristiana

Section 1	Cristiana is 55 years old, a primary school teacher with 32 years of experience. She has a diploma from teaching-training school (istituto magistrale). She uses her phone mostly to use social networks, but also for work-related activities, such as the online school register and reading emails.
Section 2	She has never created a website, so if she was to create one she would definitely ask someone for help, maybe her partner, or she would directly ask someone to do it for her.
Section 3	She does not know what a domain for a website is because she has never had the opportunity or the need to register one. Thus, she has never used a website or an online service for registering a domain.
Section 4	She has never heard of Register.it before, so she does not know what it is about or what it is for. Furthermore, she does not know any other competitor or online tool that offers similar services.

Interviewee 5: Sergio

Section 1	Sergio is a 60 years old accountant, and has worked as such ever since receiving his diploma in accounting. He uses his phone and computer mainly to read the news on online magazines, to use social networks (only Twitter), and to watch online streaming video and to listen to podcasts.
Section 2	When he was younger, he created a website using an online tool, so if he was to create a website again, he would do it himself.
Section 3	He has a superficial knowledge of what a domain is, since the tool he used to create a website and register a unique domain is Register itself.
Section 4	He knows Register and Aruba, which is the main competitor in this market.

Interviewee 6: Pablo	
Section 1	Paolo is 57 years old and he is the owner of the Tabacchi bar which is located in Bologna in Strada Maggiore 55. His level of education is a diploma, he says that he has never particularly liked studying. He likes to be around people, the smiles, the complicity that can be given and given even by unknown people. He has always worked, since he was a child in his father's restaurant in Milan. He really likes to use social networks and to sponsor his tobacconist's bar from various direct on Instagram and also many posts / stories.
Section 2	He has never created a website but it has always fascinated him. He would love to acquire this skill, so that he can also make a web page for his business and various events.
Section 3	He has no idea what a domain is, how it is bought and what it can be used for.
Section 4	He has never used Register but once a friend of his from Milan had told him about it, having created a website himself and having bought a domain. But he has never seen or used it. He says that his friend had spoken very highly of it to him and that he felt enticed to use it.
Section 5	The first thing he notices when seeing a website are the colors, according to him they represent the message that people want to convey and it is an excellent key to reading. He likes them but they are too dark. Secondly, he says he feels confused, doesn't know where to go and feels like a sudden sale. He has noticed too much advertising. He likes the services offered very much, he did not know about the existence of all these things and he likes it very much as a new thing, he has learned something new. His only comment is: put some life into it and less publicity.

Thanks to these answers, we can highlight the **key findings** of our contextual analysis: most of the users are not acquainted with web technologies (i.e. they don't know what a

domain is and they have never created a website), but they use the web for different activities, which makes them potential users of services such as Register.it.

1.2.3 Task analysis: the steps to carry out the task

In this section we identified the context of tasks in which our target user might exploit Register.it to register a domain and manage files for a website. The aim is to observe the sequence of steps and user interaction between the website and other resources (digital or physical). The secondary purpose is to identify problems related to the correct execution of the task, such as lack of clarity in the definition of the steps that the user has to follow in order to achieve her aim. We used the color blue for those interactions external to the system.

Context and task	Steps (different paths are specified if they represent alternatives leading to the accomplishment of the same task)
Change name of the domain*	<p>FIRST PART: REGISTER A NEW DOMAIN</p> <ol style="list-style-type: none"> 1. <ol style="list-style-type: none"> a. PATH 1: <ol style="list-style-type: none"> i. Hover on "domini" in the navbar ii. Click on "dominio .it gratis" b. PATH 2: <ol style="list-style-type: none"> i. Click on "Registra" button in the home page 2. Type the domain name in the search bar 3. Optional: select one or more filters, related to the domain extension or related to the price range 4. Click "search" 5. If the domain is found: and click on the preferred one; if instead the domain is not available re-type another name in the search bar until you find an available one 6. Manually remove all domains that are not wanted, since the system automatically places all of the available domains in the cart, including those on payment 7. Click on "procedi" 8. Go to the cart 9. Click on "accedi" 10. Select a login mode 11. If you already have an account, login in within the website; otherwise start an interaction outside the website (e.g. access through Google account) 12. If you are already a customer: insert username and password; otherwise: click on "create new account" and the account will be automatically created 13. Click on "procedi" 14. Insert the holder data (multiple choice form category) 15. Click on "procedi" 16. Enter user data in the form 17. Click on "procedi" and, in case of missing information, click on the banner and go back to step 15 18. Card data entry 19. External interaction: card app 20. Click on "procedi" <p>SECOND PART: CANCEL THE OLD DOMAIN AKA DISABLE AUTOMATIC RENEWAL</p>

	<ol style="list-style-type: none"> 1) click on "log in" 2) type your username and password or login method 3) Click on the "Account management, invoices and payments" link in the right side menu to access the management of your account. 4) Click on the "Automatic Renewals" link in the Payments and Renewals section to access the Renewals and Automatic Payments page. 5) Select the products with automatic renewal for which you want to enable manual renewal, and then click on the PROCEED button. 6) Select the Manual renewal option for each individual product, or alternatively click on the All manual button to apply the change to all, and then click on the PROCEED button. 7) Confirm the change in the summary window by clicking on the PROCEED button again. <p>THIRD PART: REDIRECT THE OLD DOMAIN TO THE NEW ONE</p> <ol style="list-style-type: none"> 1) click on "log in" 2) type your username and password or login method 3) Click on the name of the old domain 4) Click on "Dominio & DNS" 5) Click on "Redirect e sottodomini" 6) Click on "Imposta un redirect sul tuo dominio" 7) Type the name of the new domain 8) Click on "Verifica" 9) Optional: Select the option "Immobilizer" to display in the navigation bar always and only www.olddomain.est and not the actual destination url (useful only if the redirect takes place in the opposite direction, that is, redirecting the new domain to the old one - for example if you want to keep the contents of the site associated with the old domain) 10) Click on "Procedi"
Change owner of the domain	<ol style="list-style-type: none"> 1. click on "log in" 2. type your username and password or login method 3. Click on the name of the domain whose owner is to be changed 4. Click on "dominio & dns" in the control panel 5. Click on "cambia owner assegnatario" 6. Search by using the search bar the domain you want to change the owner. Click "procedi". 7. If the domain in question has a .it or .eu extension, you will be prompted for the category of the future owner of the domain. Select the category from the list and Click on "procedi", otherwise just go to the next step 8. Enter all the data relating to the new assignee / admin.c of the domain 9. Click on "Invia richiesta" 10. Download and sign the request form for the change of assignee (sending the paper documentation is not necessary in the case of .com, .net, .org, .biz, .info, .mobi domains.) 11. Go back to your control panel 12. Click on the exclamation mark with a red background next to your domain name, in the right column 13. Click on "maggiori informazioni" 14. Click on "Dati e Documenti del dominio"

	<p>15. Click on the link “Documento per Cambio Assegnatario”.</p> <p>16. Print and sign the document</p> <p>17. Send the signed and scanned document (in PDF or JPG) as an attachment to the email address documentation@register.it</p>
Register a domain already taken (chat with the owner)	<ol style="list-style-type: none"> 1. Access to the main domain area or to one of its subsections, either <ol style="list-style-type: none"> a. hovering on “Domini” in the navbar and clicking on one option between “Dominio.it gratis”, “Dominio Business”, “Nuovi domini” or “Domini geografici italiani” b. clicking on “Domini” in the navbar 2. Type the desired domain name on the search bar and click on “Cerca” 3. Click on “Whois” link provided beside the message “Siamo spiacenti,” [domain name] “non è disponibile” (assuming that for this task the domain name must have been already assigned) and, if interested, get information about the current state of the website associated with the domain name (who is the owner, which are its contacts, when the domain name will naturally expire...) 4. Proceed with the mediated negotiation: <ol style="list-style-type: none"> a. Click on “negoziazione del dominio” link provided below the message “Siamo spiacenti,” [domain name] “non è disponibile”. b. Let register.it staff know that you are interested in a mediator to intervene in the negotiation process, either: <ol style="list-style-type: none"> i. calling the number shown ii. clicking on one of the “Contattaci” buttons appearing in the page you were redirected to c. Fill the form with your personal data d. Select “negoziazione dominio” in “Servizio richiesto” field e. Check the reCAPTCHA box to confirm that you are not a robot f. Click on “Invia richiesta” g. Get contacted by staff via email h. Establish how much you can invest in the negotiation i. After the staff contacts you back, decide whether or not to accept the final offer j. In case of success, follow the steps of the task “Register a domain name” 5. Proceed with an independent negotiation: <ol style="list-style-type: none"> a. open a browser window b. type the domain name you are trying to obtain and press enter c. look for the contact section and try to get in contact with the current owner of the domain name you are interested in d. In case of success, follow the steps of the task “Register a domain name”
Manage multiple domains	<p>FIRST PART: REGISTER A NEW DOMAIN for each extension you want</p> <ol style="list-style-type: none"> 1. <ol style="list-style-type: none"> a. PATH 1:

(even international ones)	<ul style="list-style-type: none"> i. Hover on "domini" in the navbar ii. Click on "dominio .it gratis" <p>b. PATH 2:</p> <ul style="list-style-type: none"> i. Click on "Registra" button in the home page 2. Type the domain name in the search bar 3. Optional: select one or more filters, related to the domain extension or related to the price range 4. Click "search" 5. If the domain is found: and click on the preferred one; if instead the domain is not available re-type another name in the search bar until you find an available one 6. Manually remove all domains that are not wanted, since the system automatically places all of the available domains in the cart, including those on payment 7. Click on "procedi" 8. Go to the cart 9. Click on "accedi" 10. Select a login mode 11. If you already have an account, login in within the website; otherwise start an interaction outside the website (e.g. access through Google account) 12. If you are already a customer: insert username and password; 13. otherwise: click on "create new account" and the account will be automatically created 14. Click on "procedi" 15. Insert the holder data (multiple choice form category) 16. Click on "procedi" 17. Enter user data in the form 18. Click on "procedi" and, in case of missing information, click on the banner and go back to step 15 19. Card data entry 20. External interaction: card app 21. Click on "procedi" <p>SECOND PART: MANUALLY UPLOAD FILES FOR EACH DOMAIN</p> <ul style="list-style-type: none"> 1. click on "log in" 2. type your username and password or login method 3. Click on "i tuoi prodotti" 4. Click on the domain you registered 5. Click on "spazio web" 6. Click on "file manager" 7. Click on "carica file" 8. Click on "seleziona file" 9. External interaction: select the file you want to upload on your computer 10. Upload
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*It is not possible to change directly the name of the domain you own. What is possible is to register a new domain and redirect the old one to it till it exists.

From this task analysis it emerged that there are different paths to achieve the same goal, therefore for some tasks the procedure consists of a very large number of interactions.

2. Assessment of Existing Resources

Among all the possible application ideas that could be used as a driving model for this project, we have selected some applications or tools that could be considered as relevant competitors for Register.it. We also identified them based on the answers to the questionnaire produced in the previous section. They are: Aruba, Ovh, Google cloud platform, Aws, Porkbun, Namecheap.

We have decided to focus on Aruba for two main reasons:

- 1) it is the best known and most appreciated within our specific domain and the complex task we have considered (Aruba S.p.A. is an Italian company mainly active in the web hosting and domain registration businesses, and it is the market leader in Italy) - while the other competitors focus their offer on other types of services;
- 2) at a first sight, it happens to answer the needs of the specific target audience we chose to focus on.

For clarity and coherence, we decided to review Register.it itself, to spot the issues and highlight the strengths of the service with respect to the main competitor.

2.1 Expert usability review

Since the expert usability review is an analysis of a system without the help of users, so not driven by users' description, we have chosen to rely on selected guidelines to conduct the review. Before the inspection, we have collected and adopted specific guidelines, motivating our decision. The following subsections are mainly about the inspections, so: First system exploration, Direct Analysis: System vs. guidelines, Reverse Analysis: Guidelines vs. system, Detecting and describing a reasonable number of errors. After the inspection: highlighting the errors detected, specifying in which step of the review they were found and how serious they are.

2.1.1 Choice of guidelines

To carry out the expert usability review, we have chosen the **10 heuristics** of Nielsen and Molich (1994) as preferred guidelines. We chose these guidelines for their authoritativeness in the field and for the fact that they are the most used today still today. Furthermore, they answer well to the many design recommendation standards which an application should satisfy at the minimum level and if done in full respect of the guidelines, the system produced will be very usable. For the sake of completeness, we have decided to also consider some of the guidelines from the **20 heuristics** of Weinschenk And Barker (2000). We took this decision also because some of these guidelines allowed us to highlight some violations, therefore some defects in usability and user experience, which we could not have detected just by using only the 10 heuristics of Nielsen and Molich (1994). In the following sections we will report only the violated guidelines.

All in all, the criteria that we consider to review both Register and Aruba are:

The 10 heuristics of Nielsen and Molich

1. **Visibility of system status:** the system should always keep the user informed about what happens, through appropriate feedback provided within a reasonable time;
2. **Match between the system and the real world:** the system should speak the user's language, with words, phrases and concepts familiar to the user rather than system terms. It must follow conventions of the real world, and make information appear in a natural and logical order;
3. **User control and freedom:** since the user often chooses system functions by mistake, he needs clearly marked "emergency exits" to leave the unwanted state without having to go through a complex dialogue. Support undo and redo;
4. **Consistency and standards:** users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform conventions;
5. **Error prevention:** even better than good error messages is a careful design which prevents a problem from occurring in the first place. Either eliminate error-prone conditions or check for them and present users with a confirmation option before they commit to the action;
6. **Recognition rather than recall:** minimize the user's memory load by making objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate;
7. **Flexibility and efficiency of use:** accelerators — unseen by the novice user — speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions;
8. **Aesthetics and minimalist design:** dialogues should not contain information which is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility;
9. **Help users recognize, diagnose, and recover from errors:** error messages should be expressed in plain language (no codes), precisely indicate the problem, and constructively suggest a solution.
10. **Help and documentation:** even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large.

The 20 heuristics of Weinschenk And Barker (selected)

1. **User Control:** the interface will allow the user to perceive that they are in control and will allow appropriate control.
2. **Human Limitations:** the interface will not overload the user's cognitive, visual, auditory, tactile, or motor limits.
3. **Modal Integrity:** the interface will fit individual tasks within whatever modality is being used: auditory, visual, or motor/kinesthetic.
4. **Accommodation:** the interface will fit the way each user group works and thinks.
5. **Linguistic Clarity:** the interface will communicate as efficiently as possible.
6. **Aesthetic Integrity:** the interface will have an attractive and appropriate design.
7. **Simplicity:** the interface will present elements simply.
8. **Predictability:** the interface will behave in a manner such that users can accurately predict what will happen next.

9. **Interpretation:** the interface will make reasonable guesses about what the user is trying to do.
10. **Accuracy:** the interface will be free from errors.
11. **Technical Clarity:** the interface will have the highest possible fidelity.
12. **Flexibility:** the interface will allow the user to adjust the design for custom use.
13. **Fulfillment:** the interface will provide a satisfying user experience.
14. **Cultural Propriety:** the interface will match the user's social customs and expectations.
15. **Suitable Tempo:** the interface will operate at a tempo suitable to the user.
16. **Consistency:** the interface will be consistent.
17. **User Support:** the interface will provide additional assistance as needed or requested.
18. **Precision:** the interface will allow the users to perform a task exactly.
19. **Forgiveness:** the interface will make actions recoverable.
20. **Responsiveness:** the interface will inform users about the results of their actions and the interface's status.

2.1.2 First Inspection of the System

In this first step of the review of the systems selected, we explored the systems to understand the main features of both applications. This initial inspection is useful to quickly identify some key problems of usability and the goals that the system appears to satisfy.

For each application, we identified the services offered, the target supposed users and any problem that can be immediately identified.

Register

- **services offered:** Register.it is an Italian company operating in the sector of providing domain registration, hosting, virtual servers, cloud service, email provider, pec and spid, wordpress integration, website development, whatsapp pro, web marketing, ssl, brand protection and online advertising services.
- **supposed target users:** who needs to create an application and make it available on the web; or in general those who need IT services such as pec or whatsapp pro, or those who want to sponsor their business with web marketing services. So it could be concluded that demographically, the target user is a professional.
- **evident issues:** The first thing you notice is that too many interactions are required to use one of the services listed above. There are different paths to achieve the same task, which is confusing for the user because it is not clear if the paths may lead to different results in carrying out the task.

The navigation is possible through two different navigation menus where the user can log in. You immediately notice a lot of information that could be misleading for the user, especially if the latter does not have any knowledge in the field of information technology. Hovering the mouse over each category brings up different sub-categories, often useless because more than one refers to the same page, which undoubtedly do not clarify any aspect of the category itself, but create a greater form of confusion.

The word "free" is mentioned in each layer of the body of the site and is misleading knowing the various gaps that subsequently exist from this point of view.

Everything else on the site looks like a redundant, annoying and distracting advertisement.

The chosen color palette is not entirely appropriate, especially the black of the navbar which, in trying to communicate luxury and authority, does not really help research and is not impactful. Furthermore, the colors are not used in a coherent and consistent way within the site: the colors attributed to the services offered on the homepage change once the page of the corresponding service is accessed.

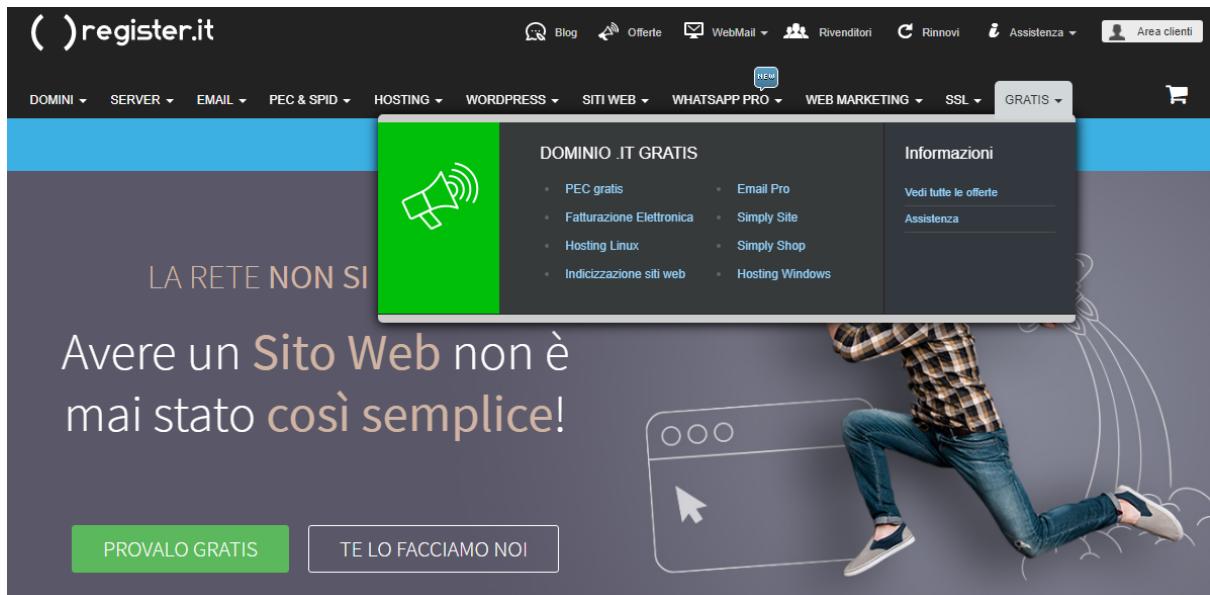


Figure 11. Screenshot of Register homepage.

Aruba

- **services offered:** Aruba is an Italian company that offers services of name registration services domain, hosting, pec, servers and collocations, trust services, cloud services, fiber, "pratiche", "rivenditori"
- **supposed target users:** in general adults, in particular with professional needs, such as obtaining a PEC, saving a digital signature, e-billing payments. However, the main target users are those ones who need to create sites or applications and make them available on the web.
- **evident issues:** On the homepage there are two navigation menus, a search bar for the domains and a further navigation system, located in the body, in which the services offered are described in boxes. The footer contains clickable links that refer to the main services offered. For all of this, the main usability issues are related first of all to the navigation system. It is possible to reach the same page, dedicated to a specific service, from different paths. Taking a concrete example, it is possible to access the hosting section from four different widgets: first navigation bar ("hosting" item); second navigation menu, immediately below the first menu, in the "products and services" category under "hosting and domains"; in the box dedicated to hosting and domains and finally in the footer there is the item "hosting and domains".
Another problem is the general organization of the site, which is confusing and redundant. It is organized in different sections that can be scrollable, in which

information relating to the services offered and general descriptions (presentation) of the company are alternate without a precise and logical order. The services are clearly stated in a declarative clickable section. However, it could result in confusion and difficulty to have a clear overview on the site's services, since at first glance the user sees two menu bars, with some dropdown elements in each of them. When the site is displayed on large screens, all the service names are listed on the menu, but in the moment in which the size of the page is reduced, all the services are collapsed in a unique button. Indeed, none of the other elements of the first menu bar seem to be not so consistent with the others and the result is quite confusing. Further, another relevant aspect concerning the provided services, is that the same offer is repeated also in the second dropdown menu, without a specific reason.



Figure 12. Cut screenshot of Aruba navigation systems.

In conclusion, even if the language is switchable among English, Italian and Spanish, some of the translations for the services' names are missing, and they stay Italian also when the language is set to English: this could consistently reduce the usability of the provided services for non-Italian-speaking users.

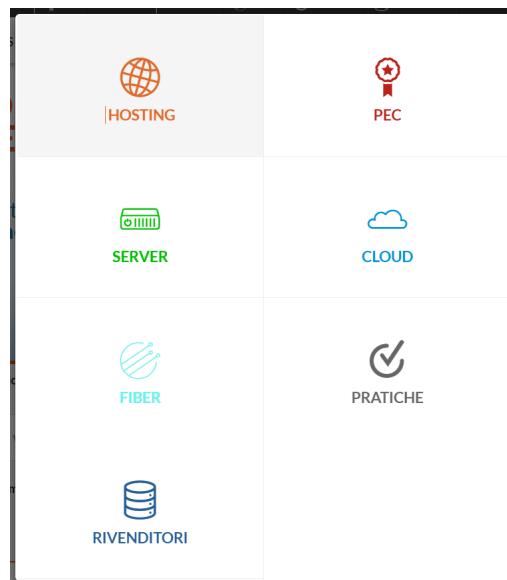


Figure 13. Cut screenshot of Aruba non-translated menu.

2.1.3 Direct analysis: system vs. guidelines

In this section of the review, we evaluated each single page or function of Register and Aruba to inspect them, to outline violations of the guidelines we have chosen, how often and with what impact.

For clarity we have decided to write in blue the violated guidelines belonging to the 10 heuristics of Nielsen and Molich; and in green those of the 20 heuristics of Weinschenk and Barker.

Register

Page or function of the web resource	Violated guideline
File manager	15.Suitable tempo
Search domain - aggiungi al carrello	18.Precision: the steps and results of a task are what the user wants.
Search domain - aggiungi al carrello, file manager	1.Visibility of system status
Homepage	2.Match between the system and the real world 3.User control and freedom 4.Consistency and standards
Registration	5.Error prevention
General	8.Aesthetics and minimalist design 10.Help and documentation 6. Aesthetic integrity 7.Simplicity

Aruba

Page or function of the web resource	Violated guidelines
Manage hosting	13.Fulfillment: the user experience is adequate and the user feels good about the experience. 15.Suitable tempo 1.Visibility of system status
Manage hosting - phase "proteggi il tuo brand"	18.Precision: the steps and results of a task are what the user wants.
Homepage	2.Match between the system and the real world 3.User control and freedom 4.Consistency and standards
General	8.Aesthetics and minimalist design 10.Help and documentation

2.1.4 Reverse analysis: guidelines vs. system

On the contrary, in this section we looked for the violation of each guideline, starting from the guideline and its definition, throughout all the applications of Aruba and Register. Obviously many of the problems found in the direct analysis can be found in the

reverse one, but we have decided to ignore them and **look for problems that have not come up yet**. We have listed all the pages in which a guideline is violated, when they are more than one.

Register

Guideline	Violation page or function	Comment
1. Visibility of system status	Search domain (aggiungi al carrello), file manager	On Register the bar with the upload percentage did not appear. This is certainly a gap but it happens mainly because the system is very fast in loading and this derives from the fact that on this Host it is not possible to load multiple files at the same time.
2. Match between the system and the real world	General	You have the possibility to choose between the Italian and the English language. The problem is that the two keys (those of language switch) are located in the footer, hidden towards the end and given the light colors they blend in with the rest of the text. It took several minutes to find them. Not intuitive.
3. User control and freedom	Offerte register.it	There is always the option by tapping the logo to go back and on the homepage. The only problem is that going to the "Free" section completely changes the Navbar and automatically changes the position of the main logo that brings the user back to the homepage, from left to right, totally disorienting the user to go back.
4. Consistency and standards	Homepage	Users wonder if different words, situations or actions mean the same thing, that is, by hovering on Domains, all the clickable fields relating to the domain come out, primarily DOMINI, and the first entry is Domini.it for free. By clicking on all three of these items you are brought back to the same page. Misleading, useless and wasting the user's time.
5. Error prevention	login	An accurate design is missing that prevents the occurrence of a problem in the first place especially in the Login phase where it does not highlight the error in a specific field or does not specify which are the required fields and this wastes time for the user to go back.
8. Aesthetics and minimalist design	Homepage	It absolutely does not minimize the information leaving only what the user really needs: it has a lot of information side by side, creating confusion and pressing a lot on the marketing of non-Italian free domains.
10. Help and	Homepage, login,	There are documentation problems, there is no page that specifies the steps that will lead users to

documentati on	search domain	register or purchase a domain or other. From the point of view of Assistance there is only a chat that puts you in the queue and could even answer you after 48 hours (there was a review that spoke of this case), there is no email on which to contact someone for general information, there is only one number that is paid.
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Aruba

Guideline	Violation page or function	Comment
1. Visibility of system status	manage hosting	On Aruba the cart is missing when you buy or select a domain, this is a gap.
2. Match between the system and the real world	Homepage	It has three language options: Italian, English, Spanish. All other European languages are missing, such as French and German of equal importance to Spanish. It is more intuitive than Register because the ability to switch the language has been included in the first navigation system with a drop-down menu.
3. User control and freedom	Homepage	By clicking on any section you enter the chosen page but it is totally impossible to return to the homepage. If you click on the main logo you stay on the chosen section. The only way to return to the homepage is to click on the first item of the first search bar which is "hosting". A sensational mistake.
4. Consistency and standards	Homepage	The site has 4 different ways to get to the same page and this happens for some sections such as the "hosting" one, which can be reached via 1) the first navigation menu, 2) the second navigation menu in the "products and services" category "Hosting and domains" section, 3) then scrolling through the body there are cards that describe and refer each to the service described and here you can again get to the same "hosting" page. 4) to conclude in the footer we have a series of clickable links that refer to the same page.
8. Aesthetics and minimalist design	Homepage, manage hosting	It absolutely does not minimize the information leaving only what the user really needs: it has a lot of information side by side, creating confusion.

10. Help and documentation	Homepage	It has absolutely no documentation and in addition to a "support" section, it does not have a real generic email on which to contact.
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An interesting case: the language switch problem

By switching the website language from Italian to English, we realized that the navbar elements changed accordingly.

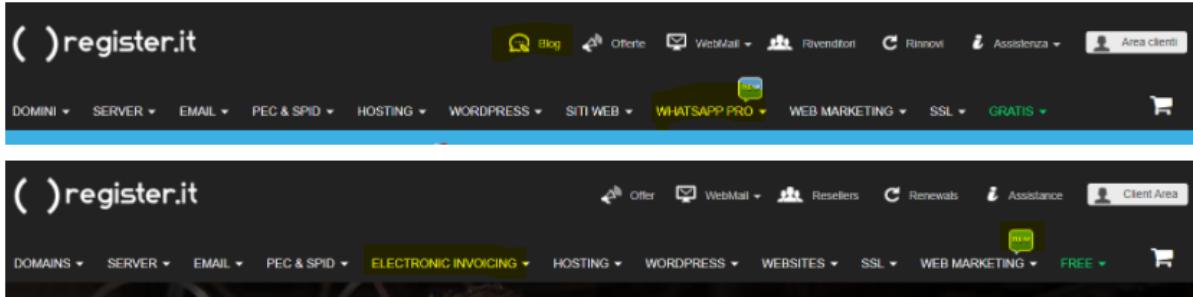


Figure 14. Cut screenshots of Register in Italian and in English languages.

First of all, the upper navbar includes a link to the Blog for the Italian language only. However, in this case, the choice could be motivated by the fact that a blog, because of its living nature, could be difficult to maintain in a bilingual version. Indeed, we can assume that the missing element in the English navbar is due to the fact that in the design project of the website it was considered that a user which doesn't understand the Italian language can neither be interested in reading Italian articles.

Instead, we considered as largely more relevant pitfalls the discrepancies between the two versions of the lower navbars:

- The English version includes an extra element with respect to the Italian counterpart, i.e.: the "Electronic Invoicing";
- The Italian version includes an extra element with respect to the English one, which is "Whatsapp Pro". However, the fact that it is labeled as "new" could also indicate the fact that the two versions of the websites may be at different levels of the same development path, and that "Whatsapp Pro" is going to be included in the English version too;
- The order of Web Marketing and SSL is swapped in the two versions, without a specific apparent reason.

After an extensive analysis of these aspects, we highlighted the following points about this structurally relevant aspect:

- It is not clear if this discrepancy is the effect of an ongoing work of uniformization of the two versions, based on a constant work of translation of a website which is originally conceived in a language but factually developed and made available in two, or if there are underlying conceptual, legal or factual reasons which motivates a stable difference in the structure of the two versions of the website.
 - Even if the differences are projectual (and so not collateral effects of the natural website ongoing development), they are not clearly motivated.

- b. This incoherence may result in a consistent confusion for any potential foreign user, who is neither Italian nor English native speaker (but may superficially understand both languages as acquired ones).

After this initial analysis of the navbars case, we decided to study this aspect more in detail. In particular, one exemplar case that immediately came to our attention while following the paths proposed in the second navbar is that of the "Gratis" and "Free" buttons.

First of all, we tried with the Italian version, and we were led to a web page showing the free offers, all in Italian language. At this point, when we tried to switch the language to English from the footer, we realized that the button wasn't present anymore.



Figure 15. Screenshot of the Italian "Gratis" page footer. No language switch options are mentioned.

In order to manage the necessity to understand whether some differences occur also among the offers presented in Italian language from the ones in English, we had to go back to the homepage, switch the language from the footer and then click the "Free" button of the second navbar. Then, we surprisingly realized that this leads again the english-speaking user too to the same external webpage (<https://offerte.register.it/index.php?promo=Gratis>), which was not translatable.



Figure 16. Image of the "Offers" page.

Accordingly with the elements emerged from this analysis, we can also conclude that this system design choice is not only dispersive and highly problematic for any non-Italian

speaker, but also that it is internally incoherent. In fact, the case of the blog could let the user infer that no service which has not been translated to English is consultable from the English version of the site. Instead, the case of the "Free" offers seems to suggest the opposite approach, i.e.: that the contents which are available in Italian language only are shown in the English version of the site too, even if without a translation.

2.2 User testing

In this section the evaluation of the system is the test of the system done by the user. The objects of the testing are both the competitor's website Aruba and the target application, which is Register. Our goals for these tests include to locate browsing barriers while participants are performing a task, to determine if the user experience is satisfactory and to identify potential design concerns to be addressed. **The tasks to carry out in the tests were chosen based on the results of our ethnographic research and expert usability review**, since both of these sections highlighted the task of greatest interest to users and the main problems concerning these tasks to be investigated further.

2.2.1 Definition of the testing protocol

In order to test both Aruba and Register websites, we selected **Discount Usability Testing** as the **method for testing** these resources. The reasons for this choice are: firstly, this report is only a proposal within a targeted and time-limited project; secondly, and this derives from the first reason, we do not have the necessary funds and means to carry out full usability testing; thirdly, it is the most suitable to test websites and application. The Discount Usability Testing (also called Guerrilla Usability Testing) was proposed by Jakob Nielsen, is a cheap evaluation method based on thinking-aloud tests. the characteristics of this method are:

- ◆ Informal: a member of the team chats with the participant in front of the computer in a small room. For some of the tests, it was chosen to perform them using remote screen-sharing technology to avoid any issue with participants safety and necessities, considering COVID-19 situation;
- ◆ Intuitive: the results should be considered as indicative and not conclusive;
- ◆ Sequential: inputs from EACH test are evaluated and resolved before starting with the next test;
- ◆ Cheap: few users (3-4);
- ◆ Advantages: in sequence, low number of participants (3-4), no professional or special laboratory. Useful as a formative test (identification of problems to be solved as soon as possible);
- ◆ Disadvantages: unable to provide metrics (for example for a comparison), but only suggestions for improvement.

From this choice on the protocol also directly derives that on the methodology, which is the **Thinking Aloud**. Informal thinking aloud is a methodology used to carry out tests that are managed directly by a team member (specially prepared) and followed immediately by an evaluation phase where it is noted if the task was successfully accomplished, if there were errors, which kind of errors and so on.

According to this method (discount usability testing) and the resulting methodology (Thinking aloud), you must tell the user the task to do, and ask him to always say what

he thinks. If necessary, help him if he gets stuck. So we need to ask the participants to say: what are they thinking, what are they trying to do, how they think they should proceed, what doubts they have, what they are reading and how this relates to the task. However, we must avoid distortions, so we cannot answer the questions the participant asks us (tell him openly that he can ask questions but we cannot answer) and not let them focus attention on aspects of the interface that would otherwise have been ignored. We don't have to ask them the reason for their actions, like: Why did you do this action?

So it is a free and informal method, which allows us to confirm or deny some ideas we got about the usability of the two systems by the analysis and review explained in the previous sections.

Since we have chosen the Discount Usability Testing method, the number of **selected participants** must be between 3 and 5. We have selected **4** participants, **relevant for our target user segmentation** (they happen to be some of those selected for the interview in the Ethnographic Research):

User	Demographic Segmentation (age range, education, income...)	Psychological Segmentation (personality, values, attitudes, interests...)
Renato	69 yo, attended a higher technical institute but did not obtain a baccalaureate (only eighth grade diploma). He worked his whole life as a craftsman, a repairman for household electronic equipment.	He uses his phone mainly for calls and video calls, not really fond of the new digital technology.
Anna	63 yo, has a high school diploma, after which she had training in the health sector: she was a nurse and then the head nurse (coordinator).	She makes occasional use of the computer, she prefers her smartphone and occasionally the tablet.
Massimo	59 yo, has a scientific high school diploma. Then he was trained in the legal field.	He usually uses the computer and the phone, occasionally the tablet. He is actually skilled with these devices since he carries out all the most common and frequent activities online and not.
Pablo	57 yo, has a diploma in accounting and having always worked in the family restaurant in Milan, he decided to open a bar-tobacconist in the city he has always wanted to live in: Bologna.	He prefers the cell phone, strictly iphone, to the computer. He has skills in using social networks especially with Instagram in making posts / stories to sponsor the bar but also his life.

The tests are organized as follows: each participant is asked to carry out three different tasks, both on Register and on Aruba. Before starting the actual test, we informed the user that the call or the meeting might be recorded, the purposes of the test and privacy policies.

After stating this preliminary information, the user is invited to carry out, specifically, the following **tasks** (which resulted from our research to be the most relevant for that specific user segment):

Task 1	Change name of the domain*
Task 2	Change owner of the domain
Task 3	Register a domain already taken (chat with the owner)
Task 4	Manage multiple domains (even international ones)

In total, we carried out five tests, one for each of our tested users, each one consisting of the performance of the same three tasks, i.e.: language switch, assistance requirement, domain acquisition.

As regards with the expected results, for each task we expect to:

Task	Expected result
Task 1	We expect the users to carry out the task but with errors (either minor or major) since some of the steps are not intuitive and clear on the website (it is not evident that to cancel a domain you have to set the manual rinnovo).
Task 2	We expect the users to carry out the task without major errors, minor errors are expected for what concerns the first steps.
Task 3	We expect the users to carry out the task with errors or inefficiency.
Task 4	We expect the users to carry out the task completely without major errors.

Finally, to evaluate a user's performance, i.e. the usability of both systems, we take into consideration the following **parameters**:

- **SUCCESS**: completion of a task without help or failure (failure is the abandonment, assistant interruption or wrong answer of the participant)
- **ERRORS**: i.e., actions not leading to success, e.g. selecting an incorrect option in a menu, performing an incorrect sequence of actions, not activating a fundamental action at the right time or at all. For repeated errors or errors causing other errors, we consider them with an increase in severity. Errors have been classified in relation to the Nielsen classification of errors to provide more comprehensive information on their severity. Eventually, we have also provided a summary table of all errors identified with their classification (section 2.2.4 Conclusions: errors detected);
- **EFFICIENCY**: number of "useless" clicks, start of the action, count the actions
- **LEARNABILITY**: performance of users who have never been exposed to the system, to see if they get acquainted with the system by using it.
- **PROBLEMS**: thoughts and expressions of frustration or confusion of the participant; not noticing something that should have been noticed; the user's impression that the task is completed even when it is not; misunderstanding the purpose or role of text, functions or sections of the system; perform an action that leads the participant farther away from the completion.
- **TIME ON TASK**: amount of time spent to complete or before abandoning the task.

2.2.2 Tests summary

User 1 (Renato), **Duration of the test:** 1h43min; **Language of the test:** Italian.

Task	Actions and comments of the user
Task 1	<p>PART ONE: REGISTERING A NEW DOMAIN</p> <p>Hover over the navbar on the "domain" link. He says there is too much stuff, he gets discouraged, says: "I don't understand among all these options what I should choose if I want to register a domain in the easy way".</p> <p>He clicks on the links of the squares on the homepage to understand what is included in the registration of a domain. He says he prefers this explanatory section rather than the navbar.</p> <p>Goes back with the browser arrow rather than contextual navigation.</p> <p>Searches the blog article to see if it explains how to register a domain.</p> <p>I suggest that he types the domain name he wants into the search bar. He is disappointed, he comments: "it's not intuitive, I didn't know you had to search for the domain name to see if it's available".</p> <p>The next page seems clear enough to him, he has a vague idea of the meaning of the extensions and expresses a preference for some rather than others.</p> <p>He clicks on the one he would like without seeing that it is already selected. Then he understands and deselects the two that were automatically selected. He clicks on proceed.</p> <p>On the additional packages page, he reads the offers, and chooses the first one because he thinks it is necessary to choose one of the three.</p> <p>Then he proceeds to register the domain slowly and in some places with solicitations, but he completes the task.</p> <p>SECOND PART: CANCEL THE OLD DOMAIN AKA DISABLE AUTOMATIC RENEWAL</p> <p>He clicks on the name of the domain he wishes to delete in the customer area. He reads the information at the bottom of the page. He would contact support because he says that he cannot delete the site, there is no option in the control panel and therefore it seems impossible to complete the task.</p> <p>After a while reading better he understands that he has to do it with automatic renewal. But he is perplexed because the explanation in the control panel only describes how to set up automatic renewal, and not how to disable it. He re-reads again. He clicks on "renew". He says "there isn't here, it can't be done". I tell him that there is and it can be done. He goes to the FAQ. The interviewer tells him where to click. The user makes an inarticulate sound of disapproval. He says: "there is no check 'I do not want to renew it'". In the end the interviewer explains to him how to do it and he says: "no it's not good, it's practically impossible to do it".</p> <p>THIRD PART: REDIRECT THE OLD DOMAIN TO THE NEW ONE</p> <p>The user makes several attempts to redirect the domains starting from both the destination domain and the starting domain, whose data he would like to transfer. He clicks on "transfers". After a few minutes he realizes that it is not the correct option. He gets lost, he wastes time. After the interviewer's suggestion, the user finds the correct button and proceeds to complete the task very slowly.</p>
Task 2	He clicks on the name of the domain he wants to change owner, then he clicks on "domain & dns" quickly and without delay. Then he clicks on

	"Transfers", wasting time reading on the page what it means and if it is right for him. The interviewer intervenes and reports it on the "domain & dns" page. At this point, after reminding the user of the task, he clicks on "change owner assignee" and types in the domain name, finally he clicks on 'proceed' and completes this compilation part of the task without major problems. It manages to download and sign the request form for the change of assignee (since it is necessary because the domain extension is .it). The final part of the task, on the other hand, is characterized by other slowdowns and minor errors, because the user does not immediately understand that he must return to the control panel in his personal area and click on the exclamation mark with a red background next to his domain name. Eventually, he clicks on "more information" only after solicitation. From this moment he manages to complete the task without significant problems, but with obvious slowdowns as regards the interactions external to the site: to print and sign the document and send it as an attachment to the email address documentation@register.it.
Task 3	The user types the desired domain name on the search bar and clicks on "Search". The domain is not available, so click on the "domain negotiation" link provided below the message "Sorry," [domain name] "is not available." Before clicking the "Contact Us" buttons appearing in the page he was redirected to, he clicks on the link "find out more" to better understand what it is, wasting time but without making mistakes. Then, he fills the form with his personal data and selects "domain negotiation" in the "service required" field. Finally , he checks the reCAPTCHA box to confirm that he is not a robot and clicks on "Send Request." The task was completed without errors.
Task 4	The user was able to register several domains at a time, with the same name but with different extensions. He is now acquainted with the customer area, so he enters the customer area and clicks on "your products". At first look if there is a way to select both domains (as they have the same name but only different extensions) to upload the same file to both. After a while he decides to try one of them first. He clicks on the domain and after a few wrong attempts he clicks on "web space". After the suggestion of the interviewer he clicks on "file manager" and from that moment on he completes all the steps correctly to complete the task without the intervention of the interviewer: the user clicks on "upload file", then clicks on "select file" and perform the external interaction (select the file from your computer) and upload it correctly. He comments: "How is it possible that I can't upload the same file on the two domains if they have the same name and only different extensions?"

Final comment: the user is not fully convinced of the system and the quality of the service offered by the company. In fact, he says he would look at competitor sites to see if they are better. But he still appreciates the site, confirming the initial impressions.

User 2 (Anna), Duration of the test: 2h17min; Language of the test: Italian.

Task	Actions and comments of the user
Task 1	PART ONE: REGISTERING A NEW DOMAIN First of all, on the homepage, the user clicks on "try for free" referring to the website creation service, even if it is in the section immediately above the domain search bar, therefore for the domain registration service. The user is therefore confused, does not understand the difference between the two services, namely that of creating a website and that of registering a domain.

So she goes to the SimplySite service. She's puzzled because it's only free for three months, and it wasn't clear right away. She reads the packages offered to create a site. She complains that the dynamics of registration and cancellation are not clear (it is not written if she can cancel after the three months free). She clicks on "find out more" of the "we'll do it for you" package (again about creating a site, not registering a domain). She reads the reviews, and appreciates that they are mostly positive. She clicks on "contact us without obligation" because she feels she needs assistance. Then the interviewer sends her back to the homepage, pointing her precisely to the domain search bar to get her to register a domain. The user says that she wants a specific domain name and types it in the search bar, then asks herself: "so you can change if I change my mind right? Here it does not say". Confusion then arises about the type of service and the options it offers. She then clicks on "search" and the domain is available. She closes the chat with the assistance avatar that opened automatically, a little annoyed because she has interrupted the action and doesn't care. The user wants to go ahead and register the domain but is confused, not sure how to do it. She clicks on "proceed", amazed that what she wanted is already selected.

Then she goes back, says she wanted to see the other available domains but doesn't quite understand what all those domains are for, what's the difference with the ".it" extension she chose. In particular, the phrase "grow your online presence with these domains" confuses her. She thinks about it a bit and she realizes after a while what extensions have, why buying more domains, but she is still not convinced.

The user thinks she has selected only one domain because it is not clear what the total of products in the cart and total cost are. She wonders if it is possible to view the products in the cart before finalizing the purchase. She wonders: "Shouldn't you automatically tell me the total number of products chosen and the final cost?". The user wastes time, looking for his products in the faceted navigation on the left, of which she does not understand the meaning and would like to close it, hide it.

Finally, she clicks on proceed after the interviewer's intervention. She is confused by the package offer page, wondering what to do with domain registration. Then she adds one of the packages. Then, not convinced, she goes back and she realizes that there are three products in the cart: she doesn't understand why and she can't see what she has added, which would be the third product to toggle. Then she unlocks again. She would like a pop up that appears when you click on "3 products in cart", telling you WHICH products are in the cart. If in doubt, start all over again, then go back to the home, retype the name and search again. This time there are five products in the cart and, exhausted, she exclaims: "five ?! why ?!". The user completes the interviewer-led only task. Her final comments are: "two important things: it's not clear how to withdraw from the contract if you don't like it; and it needs to be clearer what you are doing, there needs to be a step by step guide that tells you what you are doing and give you feedback if you are doing well".

SECOND PART: CANCEL THE OLD DOMAIN AKA DISABLE AUTOMATIC RENEWAL

The user accesses the customer area by logging in with his credentials without problems.

She says she doesn't like advertising in the customer area. She says: "this is an advertising page, not a customer area". She scrolls down the page and reads the text in the paragraph with the title "management guide". She doesn't like it because it doesn't say how to delete a domain. She says the indications are partial and incomplete. Then she clicks on the name of the

	<p>domain she wants to delete and reads the titles of the squares aloud in the count panel. She likes the "what is it" link under some headings that she doesn't understand. Then she goes to the section on expirations and renewals but she doesn't understand, she doesn't seem fit to cancel. She is convinced that the deadline coincides with the cancellation. She doesn't like the fact that there is no link from the help page to go directly to the renewal and / or cancellation page. She likes that there is support available, the support link. She says that at this point she would contact support. Under the interviewer's prompting, keep searching. She first translates some titles into English, like "advertising", and thinks that "site lock" is the closure of the site. In fact she translates, and realizes that they are two different things. Puzzled, she wastes time on the page. He says there are too many English texts that it would be possible to translate instead. The interviewer informs her that canceling a domain coincides with canceling the automatic renewal. She says she has the perception that it is not possible to do it, or that at least one does not understand how to do it. She clicks on the renewals page but there is no "cancel" or "remove" button so she complains and says she doesn't know how to do it, she is blocked. The interviewer tells her where to click: "account management and payments". She says she hadn't even seen him. She doesn't like it anyway, it's not yet clear how she should do it. She reads the description of the control panel and doesn't understand what to do. Then she clicks on the arrow beside the "renewals" section, thinking of going to the dedicated page. She says she finds the page organization meaningless, that it doesn't make sense that she has to click "automatic" to set "manual" or cancel the renewal. Then she finds the legend that explains everything and the law. Then she completes the interviewer-led task. She is disappointed and frustrated, she comments negatively.</p> <p>THIRD PART: REDIRECT THE OLD DOMAIN TO THE NEW ONE</p> <p>The user makes several attempts to redirect the domains starting from both the destination domain and the starting domain, whose data she would like to transfer. She wastes time trying different options on the control panel. She clicks on "transfers". After a few minutes she realizes that it is not the correct option. She gets lost. After the interviewer's suggestion, the user finds the correct button and proceeds to complete the task very slowly.</p>
Task 2	The user accesses her customer area without errors and first goes to "account management". She really likes that there is the blue "i" next to the options that explains what they are for, what they mean. She wants to go back to the customer area but fails, so she stays in the "account management" page. She clicks on "resellers" in the navbar. Gets lost. The interviewer intervenes and tells her to click on the name of the domain she wants to change owner, and to click on "domain and dns". From there she understands that she has to click on "cambia owner assegnatario" after translating the word "owner" on Google translator. After these initial errors, the user proceeds correctly until the end of the task, with some slowdowns around the external steps (i.e., printing and scanning the document).
Task 3	The user types the desired domain name in the search bar and clicks "Search". The domain is not available, so click the "whois" link provided with the message "Sorry", [domain name] "is not available". She takes some time to read the pop up with the domain information, but then admits she doesn't understand what that information means and decides to let it go. Then she closes the pop up and goes back to the previous page, and she clicks on the "domain negotiation" link. Spend some time on the page before clicking on the "Contact Us" button, and to better understand she clicks on the "find out

	more" link to better understand what this negotiation entails, wasting time but without making mistakes. Then, fill out the form with her personal data and select "domain negotiation" in the "service required" field. Finally, she checks the reCAPTCHA box to confirm she is not a robot and click "Submit Request". The task is then completed without errors.
Task 4	The user accesses the site and types the name of the domain she is interested in in the search bar, which she now knows from task number 1. She then selects the domain she is interested in and after seeing the cart and going back a couple of times she succeeds a proceeds to register the domain without errors but with little efficiency. She is now acquainted with the customer area, so she easily enters the customer area and access the area of her products. After the registration of this last domain she has multiple domains among her products. First she tries to understand if there is a way to see all the files of both domains. After a while she gives up on the search and selects one of the domains. After a few wrong attempts she clicks on "web space" and after reading all the options she decides to click on "file manager" for exclusion. She then uploads the file correctly and completes the task without the intervention of the interviewer.

User 3 (Massimo), **Duration of the test:** 2h 5min; **Language of the test:** Italian.

Task	Actions and comments of the user
Task 1	<p>PART ONE: REGISTERING A NEW DOMAIN</p> <p>After a quick look at the homepage, click on the "Free - Register as many domains as you want!" Option, located in the banner positioned immediately below the navigation menu; scrolls, still remaining on the homepage, to the point where he finds the bar to type. He types "cucinaonline", click on search. In these first steps the user did not encounter any particular difficulties.</p> <p>Once on the results page, the user observes the results obtained. He chooses the first available result, without dwelling too much on the extension. He adds the chosen domain to the cart, plus two others unintentionally (one of these two is for a fee). Click on proceed. He is sent to the choice of an "additional" package. The fact that they are "additional" is not clear so he thinks he is obliged to choose a package. Adds the basic one. click on "go to cart". Observe his order. He is annoyed that there are two domains in the cart summary that he hasn't chosen and that he doesn't want to buy. He deletes those not of interest, with the "x" next to each of them. While not even at this stage understands that he can cancel package selection. Click on "proceed"; he has to register. Enter data smoothly. It carries out the payment phases (outside the register.it website).</p> <p>SECOND PART: CANCEL THE OLD DOMAIN AKA DISABLE AUTOMATIC RENEWAL</p> <p>After the login phase, he reaches the control panel. Here, he takes him a few minutes to orient himself. Click the different items available. He is in trouble, he is not clear that to cancel a domain you just need to change the renewal setting, setting the renewal to manual. At this point a little suggestion from the interviewer is needed. Once you have explained that you had to make the renewal manual, first he clicks on "manage", then he goes back and he notes the dedicated renewal icon. He proceeds to change from "automatic" to "manual".</p>

	<p>THIRD PART: REDIRECT THE OLD DOMAIN TO THE NEW ONE</p> <p>From the control panel the user clicks on the item "domains and DNS". These first steps are carried out without problems. Once inside "domains and DNS" click on all available sub-items. Several minutes pass but the user is still confused. He needs a tip. After the advice the user understands that he has to redirect. It always takes a few minutes to understand the various redirect steps, but manages to complete them without further help.</p>
Task 2	<p>CHANGE OF OWNER</p> <p>Remember, from the previous tasks, that one of the "domains and DNS" items is "change of owner assignee". Click on the item and then type the domain name in the search bar. Before filling in the fields with the data of the person to whom you want to transfer ownership of the domain, reread the text on the page several times. He expected clearer and more complete instructions. Finally complete the task.</p>
Task 3	<p>REGISTER DOMAIN ALREADY TAKEN</p> <p>From the homepage, he types the domain name he wants in the domain search bar. On the results page he notices that it is not unavailable. The user is initially confused on how to proceed, first clicks on the "domain negotiation" hyperlink. Then go back and try the "Whois" link, read the specs and then go back to the "domain negotiation" hyperlink. Choose the contact option and fill out the request form.</p>
Task 4	<p>MANAGE MULTIPLE DOMAINS</p> <p>From the control panel the user navigates the various items, without results. There is expected to be a specific entry for managing multiple domains. He needs a tip. Once the user is explained that it is necessary to purchase the same domain but with a different extension, he returns to the initial page of the control panel. Note that there is a bar where you can type the domain name. Type in the domain name and he will be sent back to the search results page. Note that the results are not related to the domain searched, but are the results of the last search performed previously. Then he must repeat the search from the domain search bar, present on this page. Once the results are obtained, scrolling to find the domain with the various extensions. It adds those of interest to the cart and concludes with the various purchase steps.</p>

User 4 (Pablo), **Duration of the test:** 1h 33min; **Language of the test:** Italian.

Task	Actions and comments of the user
Task 1	<p>PART ONE: REGISTERING A NEW DOMAIN</p> <p>After a first visit to the site and some negative comments on the colors, click on the first sentence that is immediately under the navbar "Free - register all the domains you want". Clicking there, you are referred to the home piece where there are the four cards: All-inclusive domain, SSL certificates, International domains and PEC. Then click on "All inclusive domain" and you will find yourself on the "domain with all services included" page. He must write the domain he would like to have on the search bar but there is no indication that indicates this action to take. It says on the search bar "choose your domain", he is baffled for a moment, he doesn't know what to do. In</p>

	<p>the end he writes "bar-tabacchi.it" and immediately realizes that it is not available. However, he notes that there are always alternatives at 0 euros and he chooses "bar-tabacchi.store". Click on "proceed", he is sent to the choice of an "additional" package. The fact that they are "additional" is not clear so he thinks he is obliged to choose a package. Used to "avoiding scams and commercials" he decides to go ahead, even if he is quite unsure of whether or not he can do it. Fast forward to the payment stage. The task is completed successfully.</p> <p>SECOND PART: CANCEL THE OLD DOMAIN AKA DISABLE AUTOMATIC RENEWAL</p> <p>After registering with Facebook, he does not have many difficulties, having understood that he must first think carefully and look around. He can calmly find "manage" and switch from "automatic" to "manual".</p> <p>THIRD PART: REDIRECT THE OLD DOMAIN TO THE NEW ONE</p> <p>At the beginning the user got off to a very good start by clicking on "domains and DNS". At this point the user is confused, he does not know what to do and where to go. Having little time available, we show him exactly what to do, but without our help he would not have been able to finish the task.</p>
Task 2	<p>CHANGE OF OWNER</p> <p>Remember, from the previous activities, that one of the "domains and DNS" items is "change of assignee holder". However, it is all very unclear to him. He follows the instructions to change owners but complains and even says that having to send a FAX is a fairly unmodern action.</p>
Task 3	<p>REGISTER DOMAIN ALREADY TAKEN</p> <p>Returning to the beginning, when he wanted to buy the domain "bar-tabacchi.it" but it was not available. At that point he easily clicks on "domain negotiation" and easily contacts the service via the pre-filled form. He complains that there could be simpler and more immediate ways like a chat.</p>
Task 4	<p>MANAGE MULTIPLE DOMAINS</p> <p>The user entering his own customer area with his two domains does not know how to behave. He would have no idea how to manage them and how to make changes on both, we had to give him some suggestions. He stayed there for a long time and after explaining to him that to enter the 'File Manager' he would have to click a certain link he was able to enter the part from which all changes are possible. The user here got very annoyed and ultimately failed to carry out the task.</p>

Final comment: The user confirms the first positive impression, so on the whole he considers the site good, even if he criticizes the overall organization of the website, he defines it as confusing. Above all, he finds the contents of the control panel badly organized. Then he says he finds the support chat annoying, which opens at the bottom right all the time, even when it is not needed.

2.2.3 Analysis of subjective and objective data

Since the discount usability testing provides suggestions for improvement, we have deducted from the tests that we should focus on the success of the task to understand the complexity of it and what is needed by the users to carry out the task.

Comments on success, errors, efficiency, learnability, problems:

User 1 (Renato)						
Task	Success	Errors	Efficiency	Learnability	Problems	Time Spent
Task 1	No	Yes	No	No	Yes	42 minutes
Task 2	Yes	Yes	No	Yes	Yes	30 minutes
Task 3	Yes	Yes	Yes	Yes	No	13 minutes
Task 4	Yes	No	No	Yes	Yes	18 minutes

User 2 (Anna)						
Task	Success	Errors	Efficiency	Learnability	Problems	Time Spent
Task 1	No	Yes	No	Yes	Yes	54 minutes
Task 2	Yes	Yes	No	No	Yes	38 minutes
Task 3	Yes	Yes	No	No	Yes	25 minutes
Task 4	Yes	No	Yes	Yes	Yes	20 minutes

User 3 (Massimo)						
Task	Success	Errors	Efficiency	Learnability	Problems	Time Spent
Task 1	No	Yes	No	Yes	Yes	41 minutes
Task 2	Yes	Yes	No	Yes	Yes	25 minutes
Task 3	No	Yes	No	No	Yes	21 minutes
Task 4	Yes	Yes	No	Yes	Yes	38 minutes

User 4 (Pablo)						
Task	Success	Errors	Efficiency	Learnability	Problems	Time Spent

Task 1	Yes	Yes	No	Yes	Yes	20 minutes
Task 2	No	Yes	No	Yes	Yes	23 minutes
Task 3	Yes	No	No	Yes	Yes	20 minutes
Task 4	No	Yes	No	Yes	Yes	30 minutes

General conclusions:

- **Task 1:** This task can be considered as the most difficult and problematic, since three users out of four weren't able to carry out the task correctly. Although there were several errors and problems in each test, learnability was noticed too for some of the users. Also, it took much more time than the other tasks, resulting in being complex both for times and for the steps required;
- **Task 2 and Task 4:** These tasks have proven to be easier to carry out than expected, since most of the users were able to perform it correctly without catastrophic errors. After task number one, these are the two tasks that took the longest time to reach the desired goal. Learnability and efficiency were shown by most of the users;
- **Task 3:** Three users out of four were able to carry out the task without the help of the interviewer, and it took the least time of all. Apart from one user, neither learnability nor efficiency were detected in the tests.

2.2.4 Conclusions: errors detected

In this final section, we focus on each error detected in at least one of the previous sections, in order to describe **its nature, the circumstances in which it was discovered** (before exploration, direct analysis, inverse analysis, expert usability review, user testing) and **its possible classification**, according to persistence, frequency and impact.

The identified errors are listed below and briefly described. A further table is then presented, to provide a more detailed overview of the related problems.

- **bad-structure related delay:** the bad organization of the page led the user to suppose - for a limited amount of time - that the required task could not really be performed in at least one of the two sites;
- **collateral acceptance of unrequired services:** the misleading process flow led the user to accept not-required services (generally on payment), e.g.: the user added involuntary extra items to her own cart and noticed it only on the verge of paying.
- **reduced efficiency due to the choice of the wrong alternative path:** the site provides two or more alternative paths to reach the same goal, and the user instinctively chooses the longest one.
- **not internally provided help:** after a consistent amount of time spent on trying to understand a passage of the task-accomplishment process the user looked for help outside of the site; e.g.: The step-by-step explanations contained non easily

comprehensible terms which were not familiar at all for the user, so that she had to browse them externally.

- **formation bias-related delay:** the previous experience of the user led her to instinctively look for the task solution where she expects to find it, but this choice results in a time loss.
- **incorrect use of colors:** colors are not used in a coherent and consistent way throughout the website, resulting in confusing the user.
- **misleading information:** on the site there are pieces of text or images or other forms of media that produce misleading information for the user, which is annoying and distracting.
- **violated precision:** the steps and the results of task are not what the user wants (e.g., when the user selects a domain, all of the available ones are automatically added to the chart, even the paid ones).

Errors are then classified according to persistence, frequency and impact. For each of these parameters we have thought of an intensity linear scale from 1 to 5, as in the following:

IMPACT: impact was determined based on the Nielsen error classification and also on the principle that if an error or violation of the guidelines is present in a sector or function of the site where there are major tasks is considered a more serious error than another one that is found in a function or section not relevant for user testing.

1 - **Cosmetic error:** the user completes the task in a reasonable time but you can see a possibility of improvement;

2 - **Minor error:** the user carries out the task in an excessive time and / or with a large number of errors and / or noticeable by the user himself;

3 - **Major error:** the user completes the task after a significant time and relevant questions, doubts and wrong choices;

4 - **Catastrophic error:** the user cannot carry out the task;

5 - **Implementation error:** the completion of the task requires a feature that the user knows but which, although announced by the interface, is missing or does not work.

FREQUENCY:

1 - very few users (also considering us developers) encountered this error

2 - few users (also considering us developers) encountered this error

3 - around half of the users (also considering us developers) encountered this error

4 - most users (also considering us developers) encountered this error

5 - all users (also considering us developers) encountered this error

PERSISTENCE:

1 - error present in very few functions or pages

2 - error present in some functions or pages

3 - error present in around half of functions or pages

4 - error present in most of functions or pages

5 - error present in all functions or pages

Error	Code	Where it is present	How the problem was discovered	Persistence	Frequency	Impact (Nielsen classification)

						on of errors)
Bad structure related delay	A	general	direct analysis, user testing	5	4	2 - Minor error
Reduced efficiency due to the choice of the wrong alternative path	B	general	reverse analysis, user testing	3	4	3 - Major error
Not internally provided help	C	domain registration	user testing	2	1	2 - Minor error
Formation bias-related delay	D	general	user testing	3	2	2 - Minor error
Incorrect use of colors	E	homepage	first inspection	1	4	1 - Cosmetic error
Misleading information	F	homepage, domain registration	first inspection	3	2	2 - Minor error
Violated precision	G	general	direct analysis, user testing	4	4	4 - Catastrophic error

2.2.5 Urgency Curve

The latter classification of errors now comes in handy to develop an urgency curve.

- 1) This **bidimensional chart** is intended to provide a spatial representation of the identified errors, with respect to their impact and the persistence or frequency of their occurrence. According to the related collocations, it is possible to define a priority scale for the fixation of all the listed errors.
- 2) We have identified **four zones** in the chart:
 - a) The **green** area is where we collocate the less relevant errors, which combine both a low impact and a low persistence or frequency;
 - b) The **yellow** ones correspond to either low impact and high persistence/frequency or high impact but low persistence/frequency;
 - c) The **red** zone is the one in which we find the errors needing immediate intervention, because of a combination of high impact and high persistence or frequency.
- 3) The **blue line** in the chart is the **urgency threshold that** we set to 3 for both the impact level and the persistence/frequency rate. The errors above this have been further divided into two urgency bands: errors to be solved immediately (red zone) and those to be solved afterwards or in a second release (yellow zone).

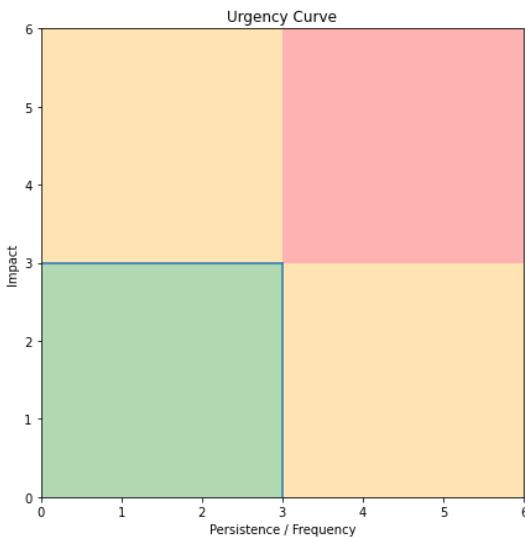


Figure 17. Urgency Curve chart.

Errors mapping overview and related charts

- A) **Bad structure-related delay:** resulted as a very highly persistent error and also as a considerably frequent one, which was spotted in all functions or pages, and that most users encountered. Its impact, instead, was labeled as minor.
- B) **Collateral acceptance of unrequired services:** very low-persistence error, which was encountered by around half of the users. However, its impact is catastrophic, because it resulted in the impossibility to carry out the task.
- C) **Reduced efficiency due to the choice of the wrong alternative path:** averagely persistent and quite frequent error, with a major impact, because it caused significant time expense for the accomplishment of the affected tasks.
- D) **Not internally provided help:** not frequent nor particularly persistent error, with a minor impact.
- E) **Formation bias-related delay:** classified as a minor error, since its impact was not particularly relevant. Its persistence is on the threshold level, while its frequency lets it be placed in the green zone of the chart.
- F) **Incorrect use of colors:** very lowly persistent and impactant error. However, it was encountered by most of the users.
- G) **Misleading information:** cosmetic and non impactant error, with a persistence on the threshold and a low frequency among our users' experiences.
- H) **Violated precision:** relevant error under all the considered perspectives. It is classified as a catastrophic error, since it prevented the users from accomplishing the affected tasks. Further, it occurred with both a high frequency and persistence.

Impact/Persistence

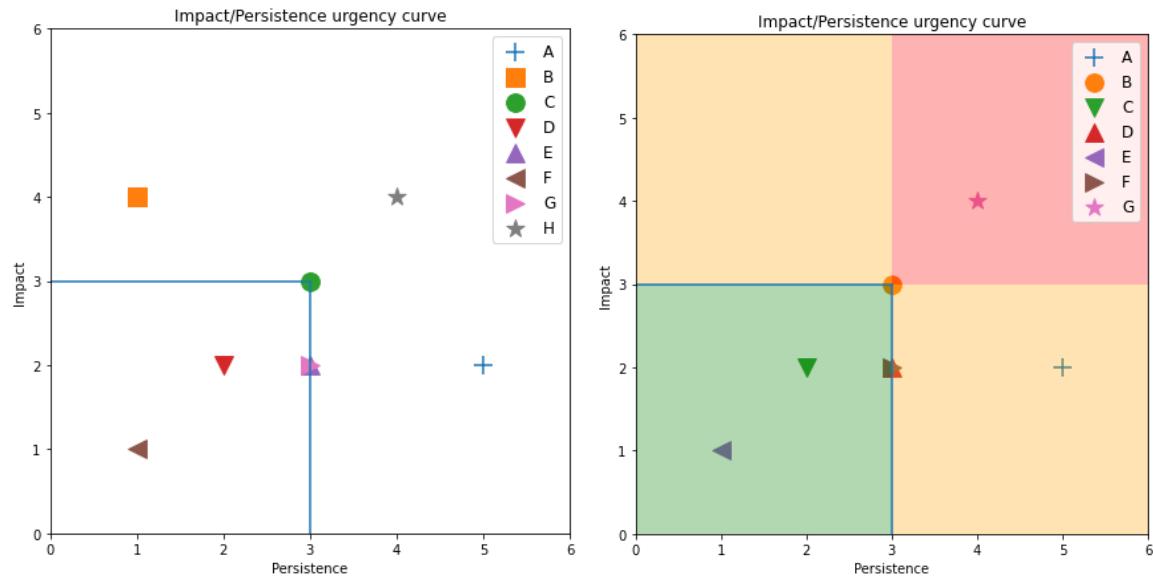


Figure 18. Urgency Curve: impact/persistence.

Impact/Frequency

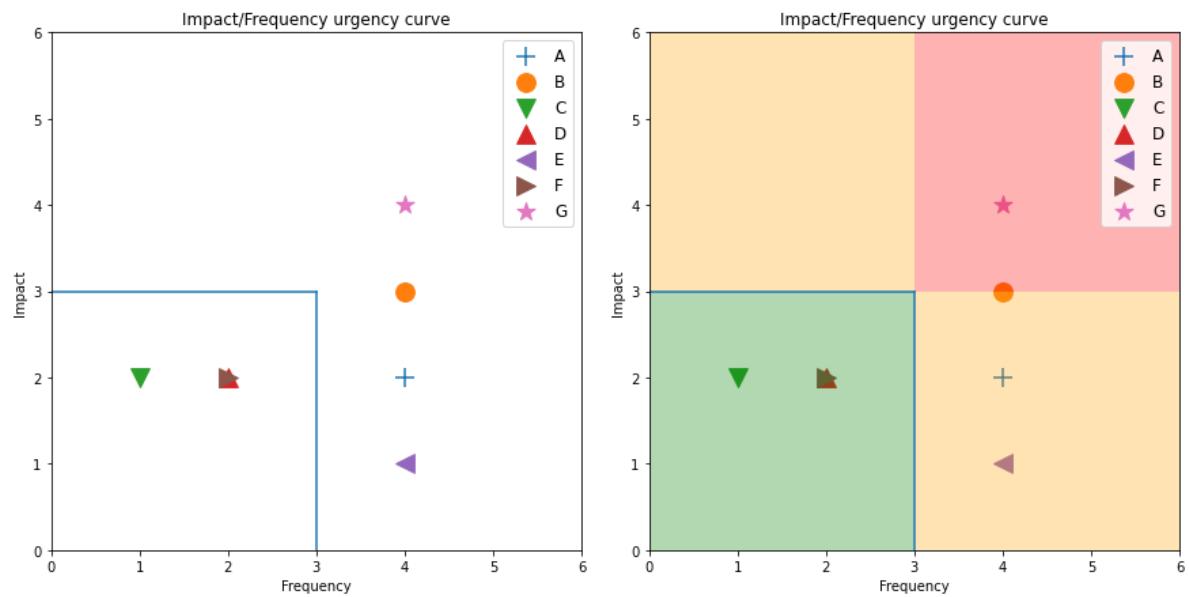


Figure 19. Urgency Curve: impact/frequency.

3. Feasibility Study

3.1 Context of use

In this section, to better grasp the context of use, we focused our attention on the types of **users** designated to use the platform, thus their needs and their characteristics; the intended **tasks**; and the technical and environmental **constraints**. The goal of this part of our project is to make sure that all factors affecting the use of the system are identified before starting the design, and creating a base for usability tests.

3.1.1. Intended users

On the basis of the performed Ethnographic Analysis, we initially assumed as the target group **people between their 50s and 70s with no knowledge of computer science and only a superficial knowledge of the web; since the Register.it services offered are not mainly dedicated to them.**

More specifically, our research revealed that these types of users use computers or smartphones to perform the following activities mainly: using social networks, video and music streaming sites, but also online shopping and internet banking. Therefore activities that require a very superficial knowledge of the web and web technologies.

With respect to this, we decided to proceed with the development of solutions we are going to present in the next steps with a particular attention to the values and knowledge of this category of users, keeping in mind what their web and digital experience is based on.

In relation to that, we intend to exploit these circumstances and the related information to structure a more detailed design around our reduced and more specific segment's necessity. This choice is supposed to help us be more focused and user-oriented in the development of our design system; indeed, among our guiding principles there will be:

- a. User-friendliness
- b. Maximized intuitiveness
- c. Exploitation of inspirations from modern online services, with which our users are supposed to be familiar with
- d. UUX-driven approach

In particular, specifically based on the target of users we have chosen, we have decided to focus on some keywords that represent the concepts that underpin our design and the message we want to convey to the user, in order to break down the perception of complexity that this type brings. of users not to complete the task. The **keywords** are as follows:

- a. **attractiveness**
- b. **reassurance**
- c. **reliability**

Given the type and characteristics of the target users we have chosen for the design of our prototype system, we have decided to focus on the greater **ability to interpret the text that characterizes this type of user, which can be a downside when it comes to follow procedural steps that must be interpreted uniquely**. So we understood, especially after user testing, interviews and questionnaires, that it is necessary to **focus on textual descriptions because this type of users prefer and**

value them - at least when they have to complete an important task, for which concentration is required - while struggling to complete procedural tasks.

Our goal is to give our intended users the possibility to create a website with a custom domain by decreasing the complexity of the task and to ensure that there are no impediments to completing a task of this type.

3.1.2 Intended tasks

The intended tasks for the feasibility study were chosen on the basis of those identified in the previous sections, expanding the set of possible tasks so as to propose the most comprehensive and general scenarios possible.

The selected tasks can be listed as the following:

- 1) **manage multiple domains**, including international domains (with extensions like .it, .eu, .fr etc.) and sub-domains (e.g. www.domain.it and www.subdomain.domain.it)
- 2) **change the name of the domain**: it is not possible to complete this task in a linear and direct way, but it is necessary to first create and register a new domain with the desired name and then redirect the old site to the new one or vice versa
- 3) **change the owner of the domain**: it is a complex task since it requires more time than the other to be carried out and it requires several actions to be performed outside the website (e.g. send a fax document)
- 4) **buy a domain already taken** or at least communicate with the current owner of the desidered domain

3.1.3 Constraints: Technical, Cultural and Environmental

Technical constraints:

- The user must possess a computer, since there is no mobile phone app version of the register website, or at least a smartphone with safari installed;
- The computer must have an internet connection, since there is no way to exploit this service offline;
- The computer must have a browser installed;
- The user must have access to a fax and a printer or a service which can provide them;
- The user must have access to their personal data and the personal data of another person (in the task "change the owner of the domain");
- The user must have an IBAN or another form of payment for the symbolic payment of 0.01 euro to register a domain.

Cultural constraints:

- The user needs to speak either English or Italian.
- The user needs to have at least a basic knowledge of what a website is and what it is for, but no specific computer-science knowledge is required.

Environmental constraints: there are no relevant environmental constraints since the service can be used wherever the user prefers, with no time or place limitations. The only exception is the human assistance service, which is available from 9 a.m. to 6 p.m.

3.2 Scenarios

We propose four scenarios as little stories to tell how users can complete a personal goal realizing one or more tasks on the system we are working on. We will not specify the specific features of the system, since for now we want to be system-independent, but we will focus on the goal and task relationship, the actions internal and external to the system, the motivation and aim of the user to use the system.

First Scenario: Lina and a wool-based small business

Who: Lina Scarpieri

Where: Lugo, RA

Device: Old Samsung computer, Windows OS

Background story: Lina is 73 years old and has lived in Lugo for most of her life. Actually, she was born in Mezzolara, a few kilometers from where she lives now. She moved as a young woman, at the age of seventeen, to work in the fruit and vegetable company where she met her future husband. She did not have the opportunity to study, having to leave school during middle school to help her mother and sisters around the house. She never liked studying, so she didn't mind leaving school to spend time home with her family. Her favorite moments were those with her paternal grandmother, who always had an eye for her and an unconditional affection, as well as having taught her to knit and crochet. After working almost fifty years, Lina began spending her days knitting and crocheting, initially only for herself and family members, but then over the years she has cultivated this passion to the point of becoming very experienced and very good, also thanks to the help of her niece Clara who helps her search online on the web for new patterns, tricks and secrets of knitting. For this reason, Lina started selling her works at the Monday market in Lugo and at the Thursday market in Mezzolara, as well as to friends and acquaintances. However, under the advice of her son Lorenzo, she would like to expand her business and sell her handmade items online on her own website. Lina has already created a website with Register.it by registering a domain with a name that is a bit difficult to remember, so she would like to change her name by registering a new domain and redirecting the old one to the new one.

Scenario: Lina is at her house with her niece Clara, on a sultry Sunday afternoon in July. They are using Clara's old computer, which she gave Lina a few months ago when her parents gave her a new one. It is a bit old and a very slow computer, but they are not in a hurry. Clara connects to the Register.it site together with Lina. Following grandmother Lina's instructions or suggestions, Clara performs the necessary steps on her computer to register a new domain for her grandmother's business. Firstly, they click on "domains" and "register a new domain". They type in the new domain desired, and it is available. Then they proceed to register the domain by entering personal and payment data. Once the registration of the new domain is completed, they access the personal area of grandmother Lina, to redirect the old site to the new one and cancel the annual subscription to the old one. To redirect the old site to the new one, Lina understands that it is necessary to click on the name of the old domain, go to the "domain and dns" section, then to the "redirect your domain" section. She then enters the name of the new domain, verify and click on proceed, completing this sub-task successfully. Then, instead of canceling the old domain (Clara says it is an unwise choice since it will take a few days before the new one is activated and since relatives and friends still have the old site) they decide to cancel the automatic renewal of the old domain in favor of manual renewal, in this way the product will not be renewed at natural expiry. Then, they return to the customer area by entering Lina's credentials; click on the link "Account

management, invoices and payments" where it is likely that there are data regarding subscriptions to the services; click on the "Automatic renewals" link in the Payments and Renewals section to access the "Automatic renewals and payments" page. On the "Renewals and automatic payments" page, select the "manual" setting associated with the old domain: first select the product and then click on the "proceed" button to select the manual renewal option. Finally, they confirm the change in the summary window by clicking on the "proceed" button again. At this point the modification is active, and the last sub-task is also completed.

Now the website on which to buy Lina's handmade clothes is "ilavoridilina.it" and no longer "vendoMaglioniENonSoloAlugoedintorni.it"

Second Scenario: Luigi and the family butchery

Who: Luigi Cingolani

Where: In the house where he lives with his wife and two of his three children, in Sirolo.

Device: Family computer (HP ALL-IN-ONE 21-B0005NL), os: Windows 10.

Background story: Luigi was born in Senigallia in 1959, but his family moved to Sirolo when he was just a child. Since he was from a humble family, his parents could not afford to let all of their children study. Indeed, among the group of three brothers, Luigi's parents chose to pay higher school instruction for Carlo only, which was not only the first child, but also the only one with a real aptitude for studying, while they pushed Antonio and Luigi toward the family butchery conduction. After some decades, Luigi is now carrying on the butchery without his brother, who formally and factually retired. Luigi, instead, is keeping working even if he has reached the age of retirement, because he is a workaholic and he has a true passion for his job. However, now that his children Mattia and Jacopo have been working with him for some years and that he trusts them, he feels comfortable with the idea of starting a slightly different kind of activity, which implies working less in the shop itself, focusing instead on an online delivery activity, in particular of ciauscolo, which is Cingolani's butchery speciality.

Scenario: In order to start his e-commerce, Luigi asks for the help of her younger daughter, Milena, who is 17 and is currently attending a scientific high school. She is pretty good at programming and, differently from her brothers, she actually can help her father in setting up the online butchery activity. In order to start, Milena suggests Luigi a website to register the domain of the online shop. After a brief discussion, it is clear that Luigi is not going to accept any compromise: he definitely wants the site name to be "cingolanisalumi.it", because he wants it to be highly recognisable and easy to remember. Indeed, he mainly conceived the idea of the online shop so as to keep contacts with tourists who spend their holidays in Sirolo and would like to enjoy the butcher's cold cuts also at their places, during the rest of the year. So, he believes that a name which is easy to remember is a must. In order to obtain the domain, Luigi and Milena browse the above-mentioned website and end up on the Italian domain names page. Luigi tries to type "cingolanisalumi.it", but when he sends the request, he receives this message: Siamo spiacenti, "cingolanisalumi.it" non è disponibile. That's a relevant problem for Luigi, who wants this name really hard. Beside the warning message, there is a clickable "whois". Unfortunately, Luigi does not understand English at all, so he doesn't get the sense of this word. He asks Milena, who explains that if he clicks on that link, he will get some information about the current website which can be reached at "cingolanisalumi.it". Luigi follows his daughter's instructions, but the only thing that he

can get is a pop-up information message providing some data about the domain owner, the organization related to this name, and so on. However, since this information is provided in English only, Luigi needs her daughter to translate for him once again. Together they understand that at least until 2022-03-21 the domain will be owned by Piero Cingolani, who seems to be a butcher based in Prato and who has no links with the Cingolani family owning the Butchery shop in Sirolo. They decide to give a look at the website: while Luigi has not an eye for this kind of details, Milena immediately realizes that the site looks quite old fashioned. The graphic design is quite poor and all the web development aspects seem to be pretty neglected. They check for the last update date among the data provided in the "whois", and indeed they get to know that the website hasn't been updated for ten years now. Then, they spot another sentence, provided just below the aforementioned message, saying "Puoi richiedere la negoziazione del dominio che prevede anche una sua valutazione". Luigi clicks on the link on "richiedi la negoziazione" and ends up on another page, titled "Recupero domini di altri", where he can choose between three options. however, the one he is interested in seems to be "Recupero per negoziazione". After having clicked on it, he is led to an info section which shows him all the details of the offer for this service. He is then asked to fill out a form providing his name, e-mail and telephone number. He will be contacted by an expert who will evaluate Piero's domain name and then will mediate the negotiation between the parties, with respect to the budget which Luigi will plan to invest in this project.

Third Scenario: Roberto and cosmetics business

Who: Roberto Rossi

Where: At his shop

Device: Apple computer

Background story: Roberto lives in Milan and he is an entrepreneur in the field of organic cosmetics. During the school period he studied at ITS Health and Healthcare, in Milan. He has been producing cosmetic products for years, including face creams, body creams, make-up and other similar products; using 90% natural materials. He has a small shop in the center of Milan, and for some years he has also had an online e-commerce. His company is family-run, his wife, who takes care of the accounting, and his two children, Andrea and Sofia, help him in sponsoring and advertising the product.

Scenario: Until now, his son Andrea has mainly dealt with the management of the website. Andrea, several years ago, bought the domain on register.it and he is the owner of the domain. Andrea wants to become more independent and decides to stop working with his father, and to start his own business. So there is the need to change the domain assignee, from Andrea to Sofia. From now on Sofia has to become the new owner of the domain.

Roberto then goes to Register.it and enters the credentials of the account that his son has given to him. He clicks on the website of his activity and among the various options available select the option "domain & dns" as it seems to him the most relevant. At this point, enter the exact name of your site as indicated in the interface and fill in the empty fields with the required values. After submitting the form, go back to the previous page where the steps necessary to complete the operation were indicated and after a few attempts he finds the red exclamation point next to the name of your site on the main page of the control panel. He clicks on it and selects the "More information" option next to "Request change of assignee". From here he selects "Data and documents of the domain" and downloads the document for the change of assignee. From here on, everything is easier for Roberto, he prints the document and fills it in with his favorite

pen. He sends it to his son Andrea for signature and scans it in order to send it in tiff format to the indicated email address. Only after repeating the operation and saving the scanned document in pdf, as requested by the site, the operation ends. Roberto receives a confirmation email inviting him to wait a maximum of 24 hours to make the definitive change. The following day Sofia is the new owner of the domain and Andrea is free to open his own business. Roberto's business has a new domain manager and is ready to restart stronger than before.

Fourth Scenario: Zaira and the backpacks

Who: Zaira Pirrelli

Where: at home

Device: Honor Pc

Background story: Zaira is a 55-year-old lady, always dedicated to work who has inherited a business from her family. The business is a stall that she then carried out with her husband Ivano. Over the years, what the stall was selling has gradually changed: from household items, to fabrics for sewing, to a few shirts, up to the point of adding postural backpacks that she created herself. By staying in the van all day to reach new destinations to sell the products, the lady had developed severe posture problems and various back pains. Standing up to sell or sitting on very uncomfortable chairs in the most delicate moments, these problems have worsened. After several years the enlightenment of her: one day the lady, to ease the various pains that were becoming more and more frequent than her, tried to place a backpack between her and her chair. From there she immediately felt relief.

During the Covid emergency, Zaira, used to always being very busy, tried to use her time in the right way: with her sewing skills she created a real postural backpack, complete with pads made with the most eco-sustainable materials.

He created several, so much so that, after the emergency was paused, he decided to start selling them in his own stall. Her success left her speechless: as many as 25 backpacks sold in a few hours, and at prices that were not entirely cheap.

One fine day, just before the re-closure due to the health situation, a gentleman, noticing the style and quality of the backpacks, decided to invest in Zaira to create a national brand. At that point, Zaira really needed a website and what better opportunity to learn even a little about using the computer. Searching on the internet you find this website called 'Register' through which you can create websites, buy domains, etc.

During the second lockdown, phenomenal news: backpacks were also requested in Spain, France and Portugal. At this point, e-commerce was needed for all three states, with different extensions. Register was an excellent solution for Zaira.

Scenario: Zaira had quite a few difficulties in creating the different domains. It was the first time she had done something computer science and Register was not very helpful. She wanted to create the same domain with different extensions but unfortunately this is not possible on Register. By clicking on "domains" she seemed to her that the procedure was simple but since the steps were not well clarified, things were not immediate.

Mainly, it was already difficult to understand how to buy the first domain without running into the various offers, after which to finish all the steps. She also realized that buying the same domain but with different extensions was absolutely not possible, and therefore she had to go through the procedure again and again.

In trying to overcome all the steps she wrote on a Facebook group where she has long been a member of friends who play "burraco online" like her and among them

fortunately there were two former programmers who were able to clarify all the steps, otherwise not she would never have done it alone.

3.3 Personas

Describing personas involved in the scenario can help understand the possible users' characteristics, what are their goals and their needs. They are tools to help focusing design and generate answers outside of our specific natural, spontaneous reactions.

Zaira Pirelli



Figure 20. Zaira Pirelli.

Zaira is a 55-year-old lady, always dedicated to work who has inherited a business from her family. The business is a stall that she then carried out with her husband Ivano. Over the years, what the stall was selling has gradually changed: from household items, to fabrics for sewing, to a few shirts, up to the point of adding postural backpacks that she created herself. By staying in the van all day to reach new destinations to sell the products, the lady had developed severe posture problems and various back pains. Standing up to sell or sitting on very uncomfortable chairs in the most delicate moments, these problems have worsened. After several years the enlightenment of her: one day the lady, to ease the various pains that were becoming more and more frequent than her, tried to place a backpack between her and her chair. From there she immediately felt relief.

During the Covid emergency, Zaira, used to always being very busy, tried to use her time in the right way: with her sewing skills she created a real postural backpack, complete with pads made with the most eco-sustainable materials.

He created several, so much so that, after the emergency was paused, he decided to start selling them in his own stall. Her success left her speechless: as many as 25 backpacks sold in a few hours, and at prices that were not entirely cheap.

One fine day, just before the re-closure due to the health situation, a gentleman, noticing the style and quality of the backpacks, decided to invest in Zaira to create a national brand. At that point, Zaira really needed a website and what better opportunity to learn even a little about using the computer. Searching on the internet you find this website called 'Register' through which you can create websites, buy domains, etc.

During the second lockdown, phenomenal news: backpacks were also requested in Spain, France and Portugal. At this point, e-commerce was needed for all three states, with different extensions. Register was an excellent solution for Zaira.

Name	Zaira Pirelli
Age	55
Education	Middle School Diploma
Occupation	Laborer
Location	Torre a Mare (BA), Apulia
Personality	Hard worker, talented, innovative
Interests	Reading, TV series, sewing
Tech skills	Bold in posting photos on facebook to keep in touch with childhood friends. No experience in the IT field, but for her being able to forward photos on whatsapp to more than one person means being a professional hacker
User goals and needs	The desire to expand the newly born brand of its backpacks, with the associated need for a website

Luigi Cingolani



Figure 21. Luigi Cingolani.

Luigi was born in Senigallia in 1959, but his family moved to Sirolo when he was just a child. Since he was from a humble family, his parents could not afford to let all of their children study. Indeed, among the group of three brothers, Luigi's parents chose to pay

higher school instruction for Carlo only, which was not only the first child, but also the only one with a real aptitude for studying, while they pushed Antonio and Luigi toward the family butchery conduction. After some decades, Luigi is now carrying on the butchery without his brother, who formally and factually retired. Luigi, instead, is keeping working even if he has reached the age of retirement, because he is a workaholic and he has a true passion for his job. However, now that his children Mattia and Jacopo have been working with him for some years and that he trusts them, he feels comfortable with the idea of starting a slightly different kind of activity, which implies working less in the shop itself, focusing instead on an online delivery activity, in particular of ciauscolo, which is Cingolani's butchery speciality. For this reason, he now wants to start an e-commerce in a website reachable at a specific and highly recognisable domain name ("cingolanisalumi.it"), hoping that in this way he will be able to send his products to the customers which come to Sirolo for their Summer holidays also when they are back to their homes during the rest of the year. His technology skills are really limited, so he definitely needs the help of his daughter Milena in order to accomplish his task.

Name	Luigi Cingolani
Age	63
Education	Middle School Diploma
Occupation	Butcher, formally retired but still working at the family shop
Location	Sirolo (AN), Italy
Personality	Hard worker, introvert but really kind.
Interests	Loves spending time with his family and is really interested in the future of his family business. He is a perfectionist, so he kept refining the quality of the butchery's products all over the years he worked there.
Tech skills	He started using social networks some years ago and he currently uses the family computer for some small research on daily information, such as the local weather and news. He also uses some websites like amazon for online shopping, but it was his daughter Milena to make all the settings, so that now, if Luigi and his wife wanted to buy something online, they just have to browse and click on the "buy now" button.
User goals and needs	Wants to start an e-commerce to keep contacts all over the year with the tourists who buy his products during the summer period. He wants a specific domain name, which is "cingolanisalumi.it", but discovers that it already exists and that it is owned by another butcher in Prato.

Roberto Rossi

*Figure 22. Roberto Rossi.*

Roberto lives in Milan and he is an entrepreneur in the field of organic cosmetics. He has been producing cosmetic products for years, including face creams, body creams, make-up and other similar products; using 90% natural materials. He has a small shop in the center of Milan, and for some years he has also had an online e-commerce.

Name	Roberto Rossi
Age	60
Education	High school graduation
Occupation	Entrepreneur
Location	Milan, Italy
Personality	Open minded, generous and kind. But he has a strong and positive attitude. He strongly believes in himself.
Interests	He deeply likes any topic about circular economy and sustainability. He likes classical music and reading novels.
Tech skills	He is a basic user, usually his main activities on his personal computer includes: online browsing, sending email and using text-editor tools like Microsoft word.
User goals and needs	He wants to make the life of his customers better by selling a product which is not only effective but green and sustainable for the environment, too.

Lina Scarpieri

*Figure 23. Lina Scarpieri.*

Lina Scarpieri is a 73 years-old retired woman, currently living in Lugo (RA). For some years now she has been selling crocheted and knitted clothes to local markets and to friends and acquaintances. Lina recently registered a domain on Register.it with the help of her niece Clara, but she decided to change its name because she wants one that is easier to remember for herself and for others. Strictly speaking, it is not possible to change the name of a registered domain because it consists of the product itself. So the task is actually divided into three sub-tasks: registering a new domain, canceling the automatic renewal of the old one (so you cancel once the subscription expires) and redirecting the old site to the new one.

Name	Lina Scarpieri
Age	73
Education	Elementary school license, Elementary education
Occupation	Retired
Location	Lugo (RA)
Personality	Outgoing and enthusiastic, very loving and caring. She is very resourceful and also a bit competitive in the things she does. She is keen to win or achieve the goals she sets for herself even at the cost of working hard and learning new things.
Interests	Knit and crochet, play buraco with friends, cook with Clara and take long walks with her dog Arthur.

Tech skills	She knows how to use a computer exclusively for writing to editing programs such as Microsoft Word and for surfing the web, which she rarely does and only in case of need.
User goals and needs	Her main goal is to expand her small handmade clothing business, to enhance her work by earning money from a long-time passion, and supplement her meager working-class pension. Given her skills, Lina needs a service that is offered by a simple and intuitive system, above all reassuring, which encourages her to use the computer more.

4. Design Proposal

Before designing our system, we have decided to adopt the CAO=S design model, which is used to adopt a **goal-oriented design approach** in economically constrained projects such as this one. This practice is appropriate when there is no budget for: a systematic analysis of the target users, to involve an outside expert in usability or to involve users in the design process. The following sections, instead, describe the design itself of the system.

All in all, our design proposal is based on a **message of tranquility, reliability and transparency - as we believe it is an effective message given the demographic and psychological characterization of our target**. For the same reason, we decided to **enhance the text descriptions** (without taking up too much space on the page and sticking to the principles of good design, so we preferred retractable sections).

More in detail, we based our design proposal on some relevant aspects that emerged from the user testing phase and the ethnographic analysis:

- 1) **Clearly and concisely presented contents:** During the user testing phase and the ethnographic analysis we could observe that our target group tends to read the most of the text presented before proceeding to the next step of the task they are trying to accomplish. For this reason, we decided to avoid prolixity, in favor of clear, explanatory texts: long enough to understand the conditions to be accepted clearly but also short enough to avoid losing the flow of the task.
- 2) **Large fonts:** Most of the people belonging to our target group have at least minimal sight problems, which - in many cases - have arisen in the last years.
- 3) **No technical terms nor unnecessary anglicisms** that can discourage / disappoint / depress those users who could not afford a complete education path.
- 4) **Enhancement of users' autonomy and involvement**, so that, even in the cases in which the users need to complete the task with the help of someone, they still can follow and understand the task path step by step.
- 5) **Fast and effective processes:** people who have worked for thirty/forty years are likely to have a consistent and economically concrete conception of time, and it is reasonable that they can easily get annoyed by a task which appears unjustifiably time consuming.
- 6) **Transparency and security:** the youngest segment of our target is represented by those workers who have experienced the 2008 economic crisis at the heart of their careers. The impact of this event made them more careful and attentive to business risks: it is likely that they make an investment such as expanding an online business only if they feel safe and trustful.

4.1 Information Architecture

We start from the definition of the information architecture of the current system, to the proposal of the information architecture of our prototype, explaining and justifying the changes in the components of the system. The structural design is the first step in the overall design of the resource, because it concerns the logical organizational and semantic structure of the information; the content and functions of a system; the combination of organization, labeling and navigation system; the art and science to shape information to support usability and discovery; a way to connect users and content bringing the principles of design and architecture into digital environments. The purpose of defining the information architecture is to correctly handle the content and make it retrievable easily by the user. While the information design is about how information needs to be designed, information architecture is about how information items are related to each other. Information architecture concern structuring - to determine the level of granularity of the data present in the content and decide how they are related to each other; classifying - to define the categories and the series of links that connect them; organizing - to group these information components into distinct and specific categories; findability - letting the user access the content and find the information they are interested in and manageability - balancing user needs with business goals. Efficient content management, policies and procedures are essential.

4.1.1 Information Ecology

To design the information architecture of the existing system, we decided to take into account the metaphor of Information Ecology to exploit and consider the close relationship between context, content and users. Eventually, we will also take into consideration our proposal for the improvement of the existing system.

Context

Register.it arises within a social context in which it is described in the definition of an Italian company that operates in the sector of providing domain registration, hosting, brand protection and online advertising services. The information contained on the site immediately leads to the useful purpose: to allow a user with a specific need to be satisfied with several clicks.

The specific business context of the institution revolves around the word "free", in which the site is easily understood that it is all free but up to a certain time frame. It is clearly a marketing technique, the goal is to "give" a domain for a year and then get it paid for or block it. The goal remains to help users even inexperienced in creating websites.

The vocabulary and structure of the site, however, is very technical, full of information that is sometimes not completely necessary and seems almost to be aimed at "stunning" the user and offering them things they may not need but which, at that point, will have intrigued them.

Content

The contents are provided directly by the creators of Register who have various servers around the world, particularly in England since many users have complained of the inconvenience of having non-Italian domains.

The textual information for non-expert users who enter this world for the first time is scarce, everything is accompanied by some photos of happy and satisfied users who have achieved their goal thanks to the site.

Each section has its own logo with the same color, they are all different from each other. So the level of granularity is low, because although there is information on the various tasks, these do not clarify the steps useful for its completion.

User

The type of target user we have taken into consideration - and accurately defined in the ethnographic research and in the feasibility study - uses the web and digital devices only for specific and limited activities, having a superficial knowledge of the web and the technologies that concern it. With this in mind, the system should guarantee the user the ability to navigate and to explore (therefore understand the system, what kind of services it offers) in complete serenity and simplicity. Furthermore, the system must be conceived and designed to allow this type of inexperienced and fearful user to complete any task they set themselves, even if it is in an area of which they have limited knowledge.

4.1.2 Components of existing system

In a **top-down model**, firstly is provided an overview of the general structure of the system, without delving too much into detail for any of its parts. Eventually, every part of the system is then progressively refined by adding more details from the earlier design stages, and the specification continues until each part is sufficiently detailed. Starting from the general overview of the system and then focusing on the single parts can help us to understand how they are connected and how they should be connected, to enhance the main functionality of the system that we are taking into consideration: the services of domain registration, hosting and managing a website.

The top-down design starts from the general business **goals**, which emerge from the definition of the context in the previous section (4.1.1 Information Ecology); and the users' goals, which can be detected by the definition of the user in the previous section too. What has to be defined in this top-down model is the **appropriate strategy to achieve these goals**.

Starting from the **general overview of the system**, we can say that it is a complex web resource, highly structured in pages, sections and subsections since it offers many different services. The content of the resource is organized by subject.

The **homepage** is structured in different sections, which are constituted as alternatives to the main navigation of the two navbars: there are no purely informative or descriptive sections, all have links that refer to other pages with the services offered by the resource, as does the navbar of the main navigation. The organization of the main navigation bar is consistent with the offer of the company: each link in the navbar concerns one of the macro-categories of services offered by the company, so they are all appropriately on the same level. It is easy to understand what the site is and what it offers. However, in the footer there is only a number to contact someone from the company (it is not specified what that number is for) and it is not provided a physical address for the company or relevant news about it.

In the **other pages**, in particular in the other three pages of the resource of our interest (domains, hosting, website management), there are other subsections for each service offered. The resource therefore appears hierarchically organized and in a very structured way, but it is not easy to understand the exact structure of the site.

Browsing aids

The website is organized into categories, each of which represents a service offered. The categories are organized hierarchically, each of the macro categories contains sub-sections. The palette of colors chosen is varied, ranging from black to white, to different shades of green and blue, but this does not depend on the category in which you are browsing. From the point of view of **global navigation**, the navigation system consists of a navigation bar containing hyperlinks, located at the beginning of the web page. The menu is simple and easy to understand, leading to the most important content. In the global navigation system there is also the footer, which contains further hyperlinks and links with the various social media, so it is a sitemap footer. The menu and links are identical on all pages of the site. Since the site is structured in a hierarchical way, there is, obviously, **hierarchical navigation**. On the hover of the main categories you can access the various sub-categories.

During the navigation it can be noticed that the bread crumbs are missing, so the user is unable to keep track of his position within the site. Finally, it is possible to notice a **local navigation** of the site, those links or buttons, scattered in the body, to suggest and help users to explore the context in more depth.

In the assistance section there is **documentation** that explains step by step how to complete the main tasks.

Wizards are present for some tasks, such as user registration or domain registration.

Search aids

There is no general search engine for the whole resource: so it is not possible, for the user that knows what they are looking for, to get to what they want in an immediate and direct way. The only search options are the search bar, located on the homepage, dedicated to searching for an available domain name. The other search bar can be found in the assistance section on the FAQ page. Both use the natural language, there is no possibility to do an advanced search as there are no search filters: you can specify filters only after having performed the search, to refine the results. In addition, there are no query builders, intended as ways to improve search performance (e.g., the use of synonyms to suggest alternative searches).

Contents & Tasks

- Images and icons: the icons use symbols that describe the category taken into consideration, they are immediately understandable regardless of the context of use, such as the hamburger menu of each category with subcategories inside, the icon of the category itself, etc.
- Titles and subtitles: the site's typography uses hierarchical formatting (titles, subtitles, paragraphs and links). The Arial font was chosen, which is undoubtedly one of the best known among the sans serifs, that is the font that ends 'in stick', without decorations. It is used because it is easier to read on the screen.

- Text blocks: the text is divided into cards, inside which there is a description with a representative photo above. It's all responsive.
- Identifiers: guidance is managed through categories of services offered. The bread crumbs are missing, the colored icons are limited to the navbar and are not present in the respective sections, not creating continuity.
- Links and internal navigation links: useful for optimizing searches and user navigation.

Invisible Components

Apparently, there are no particular and relevant invisible components, but in the search in the assistance section, on the FAQ page, the results are relevant and options are suggested as you type the search question. Other invisible components surely concern the management of data at the back-end level (server, database API, etc.)

4.1.3 Components of our proposal system

For the definition of the information architecture of our proposal of the improvement of the system, we took into account the results of the Expert Usability Review and User Testing analysis, for what concerns tests and reviews both of Register and Aruba. Considering these results allow us to focus on the problems to solve, to address them in the correct part of the system where they appear; but also to detect and value the parts of the system which are more valuable and efficient in helping the user carry out the task naturally and without problems. Thus, in this section we propose and describe some improvements in the components of the system, especially for those components that are more relevant to accomplish the task we have focused on since the beginning of this project.

Errors detected in section 2	Proposed solutions
bad-structure related delay: the bad organization of the page led the user to suppose - for a limited amount of time - that the required task could not really be performed in at least one of the two sites;	The language switch is going to be moved from its current position to the upper part of the website, with all the other functionalities, so that the user can easily and spontaneously identify them. In particular, we plan to place it in the main navbar , which is going to be exploited for the functions strictly related to the website itself, such as language switch, login, and assistance. The lower navbar is instead used for the services. Further, the file manager panel control could be reorganized in its global structure.
reduced efficiency due to the choice of the wrong alternative path: the site provides two or more alternative paths to reach the same goal, and the user instinctively chooses the longest one.	Restructuring the browsing systems , to avoid having two or more different paths to achieve the same goal or to carry out the same task.

<p>not internally provided help: after a consistent amount of time spent on trying to understand a passage of the task-accomplishment process the user looked for help outside of the site; e.g.: The step-by-step explanations contained non easily comprehensible terms which were not familiar at all for the user, so that she had to browse them externally.</p>	<p>We aim at collecting a glossary of specific and technical terms, whose instances, definitions and explanations are going to be shown with an alt attribute when the users hover them.</p>
<p>formation bias-related delay: the previous experience of the user led her to instinctively look for the task solution where she expects to find it, but this choice results in a time loss.</p>	<p>Starting from specific website's components and features which are critical to our target group, we aim at drawing inspiration from well-structured and commonly exploited web platforms whose design results are familiar to our target group.</p>
<p>incorrect use of colors: colors are not used in a coherent and consistent way throughout the website, resulting in confusing the user.</p>	<p>Choosing appropriately one color for each service offered, which is present in the navbar and it is also the predominant color in the page of the resource of that service.</p>
<p>misleading information: on the site there are pieces of text or images or other forms of media that produce misleading information for the user, which is annoying and distracting.</p>	<p>Simplification of the home page and creation of purely descriptive and informative sections, both of the company and the services offered (not all sections must serve for local or contextual navigation).</p>
<p>violated precision: the steps and the results of a task are not what the user wants (e.g., when the user selects a domain, all of the available ones are automatically added to the chart, even the paid ones).</p>	<p>Improving the system of choosing options among those proposed as results when the user searches for an available domain: no option is automatically added to the cart but only that or those manually selected by the user.</p>

General Overview

After a global analysis of the overall presentation and functions of the web services we decided to focus our study on, we opted for approaching the solution of the identified pitfalls by a structural simplification of the homepage in its globality. Further, some purely informative sections about the providing agency and the offered services are going to be included in the homepage design itself.

Eventually, a more extensive work of structural reorganization will involve:

- 1) The **customer area**, in which we plan to maintain only the information items which are relevant for the user, furtherly enhancing them.
- 2) The **control panel** in the file management section.

Browsing aids

We have decided to reorganize the global navigation menu by **dividing more clearly the services offered** by the features present. Avoid having two different paths to do the same thing. In the main menu we put the services, while in the upper navigation system only the functions such as assistance, login etc. integrating the language change. Insert breadcrumbs to help the user find their way around while browsing.

We opted for assigning a **color** to each service offered in order to help to recognize services to users more clearly. In the navigation menu, the hyperlink relating to the selected service is highlighted in the associated color. In addition, on the page relating to each service, the predominant color must be that relating to the service.

We also improved the various **wizards** (make clear which are the mandatory and optional steps, for example in the registration phase).

Search aids

To improve the components that fall into the category of search aids, we have decided to put a **general search bar to search for anything** on the homepage; and of instead put the search bar for the domain (which will be constituted as an advanced search with filters) only on the domains page, and not on the homepage. In this way, the two different levels of research are conceptually and logically distinguished in the architecture of the page: the general one, within the site, and the specific one to search for a domain of interest.

Contents & Tasks

For what concerns the presentation of the website contents and the tasks management, our intervention is going to be focused on explicability principles. In particular, we plan to individuate a selection of critical terms around which comprehension issues emerged during our testing phases, and collect them in a glossary. The final aim of this tool is that of maximizing the overall understanding of the website functions and the simplification of the tasks achievements for the users.

To improve the usability and the user experience, we plan to **focus particularly on the terms appearing in the most important and crucial phases** in which a task is performed (e.g. registration phase). In Fact, synonymous terms would be shown through the alt attribute as a **speech bubble** that appears when hovering over the specific word.

To facilitate the completion of the **task of negotiation of a domain already taken**, we have chosen to insert a new element of the page: **a chat window** with the current owner of the desired domain (in the style of Facebook Marketplace or other social-e-commerce).

As regards the **task of managing multiple domains**, we have designed a **section and a function to modify multiple domains at the same time**, if they have the same domain name and only different extensions; but we have chosen to make this possibility **optional**: it must always remain possible to modify the contents of each single domain without automatically modifying the contents of another domain.

As for the task of **changing the owner of the domain**, we decided to **propose alternative and faster methods to verify the identity, such as PEC or digital signature**.

For the **task of "changing domain name"** - that is, creating a new domain and deleting an existing one plus redirecting one to the other - we made several decisions:

- 1) we must immediately **specify**, on the domain search and registration page, **that you cannot change the name, and that the subscription lasts for one year**

- (keyword: transparency);**
- 2) in the domain management panel we have also added the **link to "delete domain"** so that it is clearer how to cancel a domain;
 - 3) as for the domain registration phase, which can be considered as a sub-task of the first task, we have chosen to **make it clearer which domains the user has selected**, then either put the list of those you have selected or between the list of available domains make the ones you have chosen more evident.

In general, as regards the components that are involved in the tasks we have considered, we have chosen to insert **more support text** in some pages, in some cases in sections that disappear and reappear by clicking on a button, for example the **modals**.

Furthermore, we have chosen to **translate the translatable words into Italian**, such as "owner".

Given the type of user, we have decided to **replace the chat with assistance or the chatbot with quick access to the FAQ, in a side panel that opens and closes**.

Finally, we have designed **lines with the steps (represented by dots)** for some procedures, such as the one in domain registration, in which the dots of the line turn green with a check (typical and familiar symbology) in the event that the user has completed that step with fairness and success; or there may be an exclamation point if the user has not performed a step correctly or has not performed it. Given the target audience, it is necessary for us to focus on textual descriptions and other elements of the page that can help this target user to complete those tasks that are more procedural and less interpretative.

Invisible Components

As a final implementation, a thesaurus will be integrated to improve the search (even when an incorrect word is entered, if more than half of the characters match a word in the thesaurus, the word is recognized).

It is also necessary to improve the system for adding an item to the cart. Avoiding that by default all the elements of the search are automatically inserted in the cart.

The **structure** of the whole system, updated with the changes proposed in this project, is presented and analyzed in sections 4.3 Interaction Design (and specifically in subsection 4.3.2 Conceptual model and conventions) and 4.4 Structure Blueprint.

4.2 CAO=S model

CAO = S is the acronym for Concepts + Actors + Operations = Data Structures, or rather the three fundamental components of the **goal-oriented design** model and the resulting one.

The concepts are the information processed by the application and reflecting the way in which the user understands and perceives their representation in the data structure. Specifically, the information architecture and presentation depend on these entities.

CAO = S simplifies and makes all the procedural features of the system more usable for the user, from the architecture of the page to the atomic operations, up to the clarity of the navigation commands.

The basic idea of CAO = S is summarized in the following points:

- Adopt all guidelines and design patterns that user communities deem useful, regardless of users and goals;

- Transform the phase of user analysis, tasks and objectives, from a design requirement to a project parameter. The more accurate the parameters on users and their objectives, the greater the degree of usability of the system;
- Identification of all user characteristics that actually have a known impact on the design domain;
- Automatic generation of interface patterns after the correct compilation of questionnaires concerning the three crucial aspects of the model: concepts, actors and operations.

4.2.1 Concepts

Concepts are the types of information as perceived by the user. Issues emerge when the concept and the structures do not adhere or they are not clearly explained in the system interface, so the user might have doubts regarding the meaning of the concept and the information it refers to. The most relevant concepts for this system and mainly related to our focus tasks are:

Concept	Explanation and definitions	Related issues	Italian translation
Domain	Unique identifier for an Internet site or Internet Protocol (IP) network address, consisting of at least two segments separated by periods. Enterprises must register top-level domains with the Web Internet Registry and pay a yearly fee to maintain the registry.	The user might not know what a domain exactly is in a URL, confusing it for other parts of the URL like the TLD or the host.	Dominio
TLD	A TLD (top-level domain) is the most generic domain in the Internet's hierarchical DNS (domain name system). A TLD is the final component of a domain name, for example, "org" in developer.mozilla.org.	The user might not know which TLD is most suitable for them, since each TLD has a meaning and a specific purpose (e.g., "com" is thought for commercial web resources)	Estensione o dominio di primo livello
Hosting	Hosting is a service that allows you to make your website available online.	The user might not know the difference between hosting and domain registration, so which one is better for them.	Hosting
Subscription plan	A subscription is a signed agreement between a supplier and customer that the customer will receive and provide payment for regular products or services, usually for a one-year period.	Possible misunderstanding of the long term nature of the accepted plan; the user may miss the global comprehension of the fact that she is not buying a specific item, but accepting a long-term	Piano di abbonamento

		contract with its terms.	
Website	A set of related web pages located under a single domain name, typically produced by a single person or organization.	Having several digital screens, inexperienced people do not know the difference between a website, web app, e-commerce and this can create a lot of confusion in understanding what you have in front of you and its potential.	Sito web
Owner	The person who legally owns the domain and administrate it.	The responsibilities and rights of the owner, what owning a domain entails and what the change of owner entails may be unclear.	Proprietario
Renewal	The action of extending the period of validity of a license, subscription, or contract - in our case the registration and existence of a domain.	It may not be clear which types of renewals are available and which ones are set automatically and which others need to be set manually and how to do it.	Rinnovo
Negotiation	The discussion aimed at reaching an agreement and consequent process of transferring legal ownership of a domain.	The concept of negotiation is linked to the uncertainty about what can be achieved through negotiation, whether a simple agreement or even an exchange of property.	Negoziazione

4.2.2 Actors

In this section, we present the human components involved in the project design, differentiating one another on the basis of the roles interpreted toward the site and its proposed interfaces, and of their contribution to the system design.

These user categories, also known as "actors", can be defined as direct and indirect, with respect to the distinction between being potential users of the application or people generally involved in the definition of its characteristics.

The direct actors, or users, can be further categorized on the base of six specific features, clearly and directly impacting on the design implementation:

- Technical competency
- Domain competency
- Linguistic competency
- Physical and visual ability
- Concentration
- Motivation

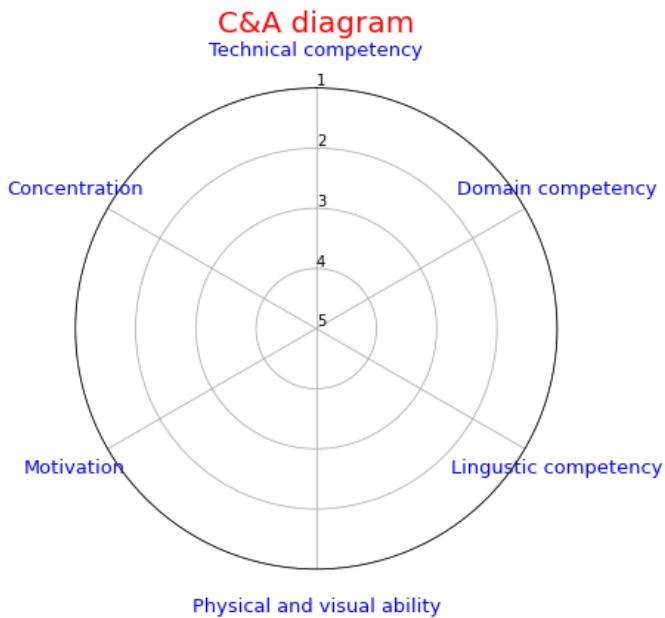


Figure 24. Diagram to visualize technical competency of each actor.

These six features are used in a radar chart to spatially represent the direct actors with respect to the characteristics influencing the way in which they interact with the web service. In particular, the scores assigned to each factor are from 1 to 5, where higher scores indicate higher levels or a better mastery of the factor under consideration. Scores on each factor or feature radiate outward on spokes from the central highest level to the external minimum.

Here below, we present four different actors, which are aimed at representing specific users just like personas, but differentiating from the latter for being focused on their role in the interaction with the system. Actors are less subjectively and ethnographically defined than personas, since their description is based on the standard model of the aforementioned six characteristics, for each of which they are assigned a level from 1 to 5, and a derived positioning in the radar chart presented above.



Name: Concetta

Age: 65

Task: **domain owner change**

Other information:

Concetta has worked all her life long in her uncles' knitwear factory and since when she retired she has been running a small online shop with her sister, with the help of their grand-children and nephews. However, her sister, who is now 75, would like to stop participating in the activity, and for this reason the domain name, which was registered to her, should pass to Concetta. However, there is no particular hurry, since

her sister's request didn't arrive unexpectedly or abruptly.

She suffers from carpal tunnel and cervical problems related to her profession, and - in addition to that - her presbyopia has got worse in recent years.

She is used to speaking in her local dialect and she can't speak nor understand English at all.

She couldn't have a formal education and she never developed technical skills related to the IT field: in particular, she finds it really difficult to understand the interactive functioning of most of the web sites and web apps she has used. The only social network she uses is whatsapp and she mainly uses the computer to read the news, check the weather reports, and send emails for orders.

Furthermore, Concetta is used to performing repetitive and manual actions, and for this reason she struggles a bit when it comes to maintaining concentration in procedural tasks.

Indeed, for the task accomplishment, Concetta is followed by her niece Valentina, who is her sister's grand-daughter.

Carrying out the task

First of all, under Valentina's suggestion. Concetta starts acceding to the personal area of the account she created with her sister for the online shop. Since she has already assisted the access procedure to manage their website, she directly clicks on the domain name of their only website and goes to "dominio & dns" in the control panel. Luckily, the task she has to perform has a suggested path of execution which is absolutely intuitive to identify. So, she is easily led to "cambia owner assegnatario", but before clicking on it, she asks for her niece's confirmation.

Since the next steps are crucial for the successful accomplishment of the task, Concetta asks for Valentina's help, both because the required data are the ones of her grand-mother and she should know them as well as Concetta herself does, and also because typing on the keyboard and watching at the screen imply a sensitive effort to Concetta, who is both visually impaired and sick of a severe carpal tunnel syndrome.

After that, she is invited by Valentina to click on "Procedi" and to go on on her own.

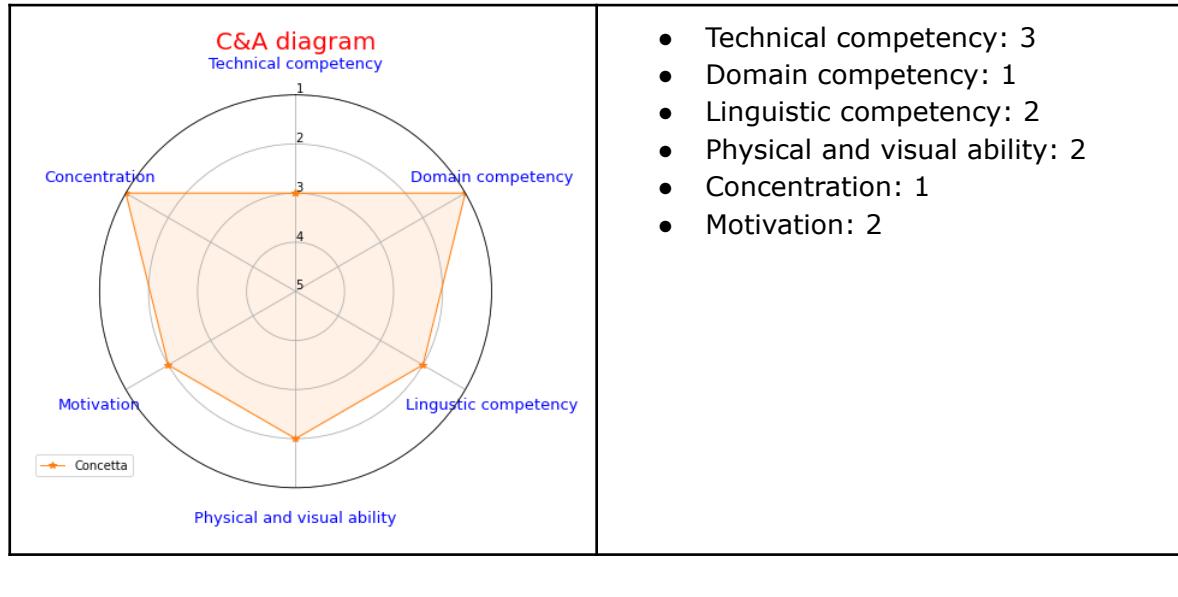
Concetta realizes that they need the help of her sister, since now they are requested to download and sign the request form for the change of assignee.

After that, Concetta is visibly distracted and bored, and Valentina has to keep her attention high by explaining step by step what is happening, and, where possible, asking her to try to go on on her own.

After going back to the account control panel, Concetta is more confused than before, so Valentina suggests she clicks on the exclamation mark to get more information. Concetta clicks then on "Dati e Documenti del dominio" and then on the link "Documento per Cambio Assegnatario", which immediately catches her attention, being a really clear and concise command.

At this point, Concetta prints the documents with her own printing machine and signs them. However, she needs once again her niece's aid for interpreting correctly all the

instructions (both because they seem to be quite technical to Concetta, and also because they are shown in a very small font) and, in addition to that, for scanning the documents back, since she does not know what the required format names (i.e.: PDF or JPG) mean. As requested by the instructions, she independently sends the documents back as attachments to the email address documentation@register.it.





Name: Donato

Age: 58

Task: Management of multiple domains

Other information:

Donato is a luthier; he has a well-settled business in Northern-Italy, which has been spreading internationally during the last few years. He separated from his wife in 2010, and now he lives on his own. Donato is pretty confident with the basic usages of computers, tablets and smartphones, tools that he uses for buying online pieces for crafting his instruments, but also for self-entertainment, for example when he spends time on social networks.

He is really determined and he decided to develop his first website on his own, following a course about WordPress, asking for advice only for the implementation of e-commerce.

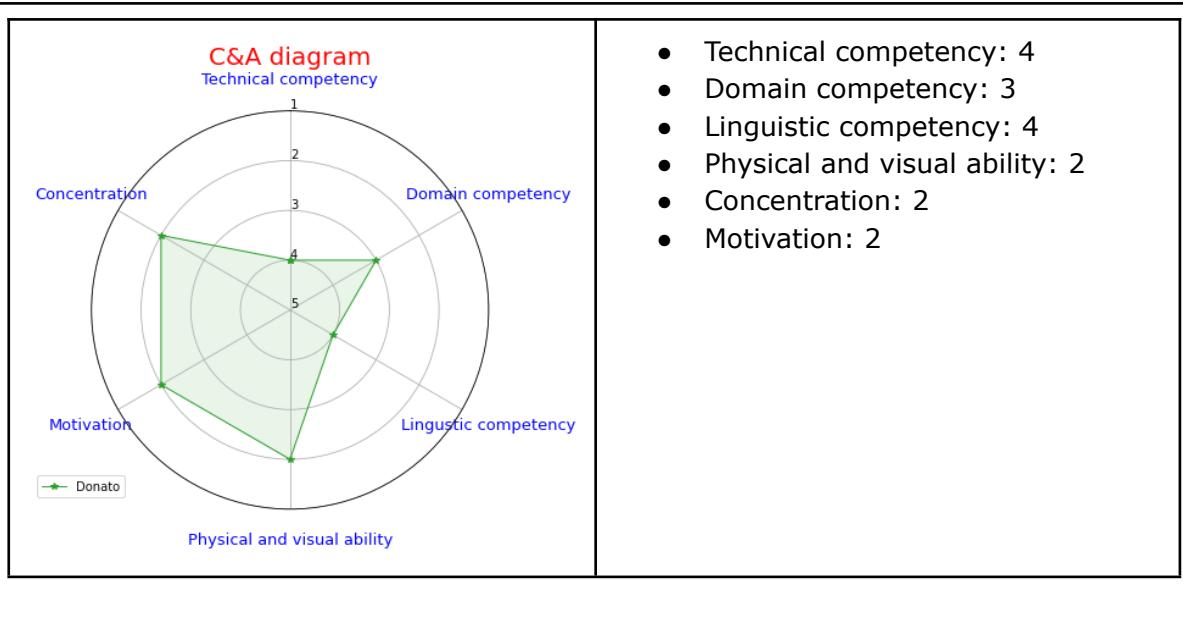
He speaks standard Italian correctly, and does not speak in his local dialect even at a confidential level. Furthermore, because of his work he has also learned a few simple English phrases.

In spite of being overall physically strong, his vision has deteriorated over the years due to his work of precision, as well as being visually impaired by nature, and he suffers from frequent migraines. He doesn't really like spending too much time in front of a computer screen, and generally the time he devotes to updating his website consists of a few hours in the evening, when he returns from his shop, often tired and with a headache.

Donato has recently decided to expand his business abroad and thus wants international domains. However, his customer base is mainly in Italy, around his physical shop, so he considers it as a plus, albeit useful, since once the international business has started it should reap many benefits with a minimum effort in maintaining the platforms.

Carrying out the task

Donato starts his task at the end of a stressful working day. To begin, he does what he is used to in the circumstances in which he has to manage something related to his website, i.e.: he goes to the control panel and tries to browse the website, looking for some explicit invite to obtain a new domain name related to an already existing one, but nothing catches his attention. He is really tired and starts thinking that the problem could be his poor concentration and sight. For this reason, before proceeding, he tries to increase the font dimensions of the page. After some other unsuccessful attempts, Donato starts the same process he followed to obtain his first domain name, hoping that with slight modifications he could obtain other similar domain names, with international extensions. He is really tired, and he keeps thinking that if this attempt does not succeed, he will try again tomorrow. So he goes back and exploits the domain search bar to type his own domain name. Obviously, the domain name with the extension .it is already taken, but he suddenly realizes that he has to select the different extensions he is interested in among the ones which are presented as available. Eventually, Donato is quite relieved, and just adds the domain names he wants to the cart and concludes the purchasing process just like he did with the first domain he bought.





Name: Mario
Age: 72
Task: Negotiation of a domain name
Other information:
 Mario is a local painter, whose family could not afford his formal education. He completed primary school and suddenly had to find a job when his mother got sick at the beginning of the 60s.
 In spite of his color blindness, he started producing beautiful oil paintings as a hobby during his teenage years. By the 80s, the art became his full-time job, when he got known all over Rimini and also in some galleries in the rest of the region.
 He is not very familiar with the IT domain in its whole and he got help from his grand-daughter Martina, who is an IT student, for the development of his advertisement website. However, Mario wanted to closely supervise the website creation process, since he was very interested in the artistic rendition of the page and also curious of the inner dynamics of the web development in its whole, which were totally new for him.
 Then, he decided that he wanted the website to be available at www.mariobaldi.it, since he preferred the domain name to be simple and easily memorable.
 Unfortunately, at the time of the website publication, the name is already taken, so he decides to start a negotiation with the help of Martina, exploiting a suggested service. However, the practice is really long and he gets distracted at some points, since he expected it to be easier and faster.

Carrying out the task

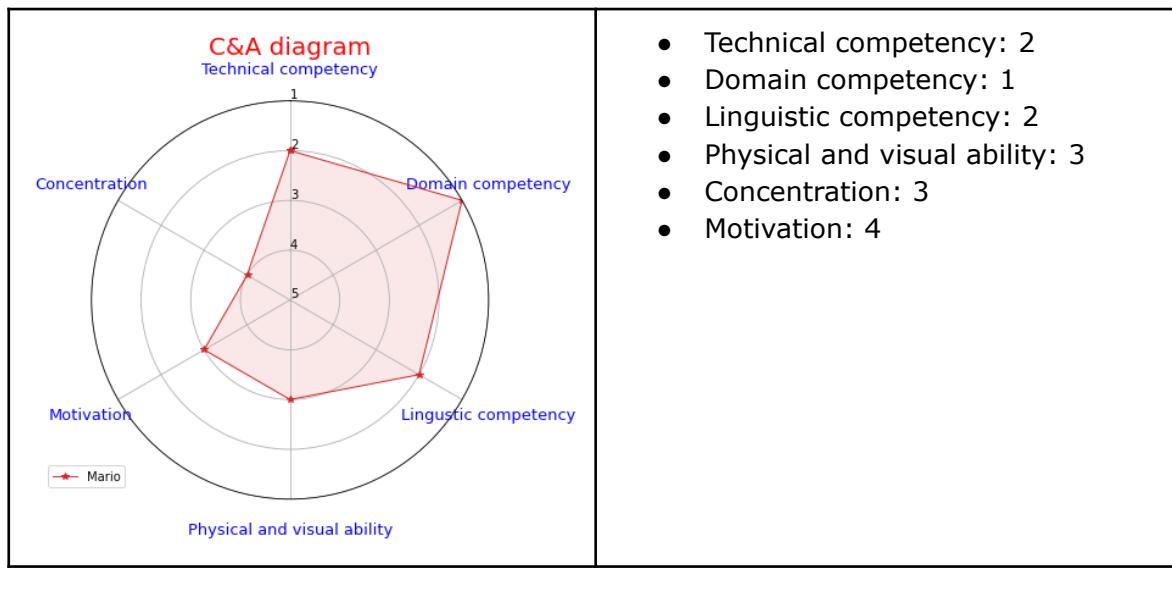
Since Martina expects this task to be quite easy to complete, she encourages her grand-father to try to carry it out as independently as possible, under her supervision. To begin, she suggests that he types the name he would like for his domain in the search bar. The user types the desired domain name in the search bar and clicks "Search". So, after typing "mariobaldi" and clicking on "search", Mario realizes that this

domain name is already taken. He analyzes the page more closely but nothing in particular catches his attention: he immediately thinks that nothing in the page structure catches his attention in particular. Indeed, he is generally led to pay attention to the color shadows that his colorblindness allows him to perceive, but the whole page seems to be in grayscale. So he starts reading the written tips. First of all, he notices that below the negative feedback message there is a checkbox which allows him to change the extension. However, he wants it to be .it, and for this reason he decides to avoid clicking any other possible option. Then he looks at this right and finds a list of possible alternative names, which he is equally not interested in.

Martina understands then that Mario is not going to instinctively get that he should click on the "whois" link provided with the message "Sorry", [domain name] "is not available", either because he is not familiar with the linking color conventions or because he just doesn't perceive that that small text is of a different color shade. So she asks him to click on it and read the pop up with the domain information. Unfortunately, he doesn't get the informative content of the message provided, and starts getting upset, both because the message is in English and because even after Martina's explanation he can't fully understand what he should do with that information.

However, Mario is well determined to complete the task, so he closes the popup and goes back to the previous page. In order to avoid losing her grand-father attention, Martina quickly suggests clicking on the "domain negotiation" link by pointing at it for him.

Mario is then redirected to another page, where he instinctively wants to click on the "Contact Us" button. However, before doing it, he asks Martina if this choice makes sense to her. He also notices a section providing extra information, but he does not click on it, implicitly trusting Martina, who doesn't tell him to perform further actions before filling the presented form. Mario fills the form without particular problems, providing his personal data. When it comes to choosing the required services, Martina confirms that he has to select "domain negotiation". He reads the message asking him to confirm that he is not a robot. He laughs, since he does not understand why he is asked such a weird question while filling a form. After the reasons for this request are clarified by his grand-daughter, he eventually checks the reCAPTCHA box to confirm and autonomously clicks on "Submit Request".





Name: Linda

Age: 62

Task: change the name of the domain

Other information: She owns a professional cleaning company which is active in the metropolitan area of Rome.

Even if she is still physically active, she is now on the verge of retirement and she would like to give an idea of continuity in the management of the activity by adding her family name (as she is the founder) in the domain name of the website that she requested to develop some years ago.

In particular, she would like the name to change from "lindiepintiroma.it" to "desantis-lindiepinti.it". She is not familiar at all with technology and in particular with the web development field, in which she generally asks for the help of her husband, Stefano.

Indeed, Stefano largely helped Linda in the ad website development two years ago, and his contribution is largely needed also on this occasion.

During the task accomplishment, Linda keeps getting distracted, since she deeply trusts her husband and knows that he is largely more competent than her in this field: she just sits beside him to follow his actions and to make sure that the aim is reached and that the new domain name is obtained.

Carrying out the task

As suggested by Stefano, Linda starts by checking whether the name that she wants for her new domain is available, through the hosting website that they used when they registered their first domain name two years ago. In the result page, she is shown different possible extensions, and she chooses the one she wanted from the beginning: .it.

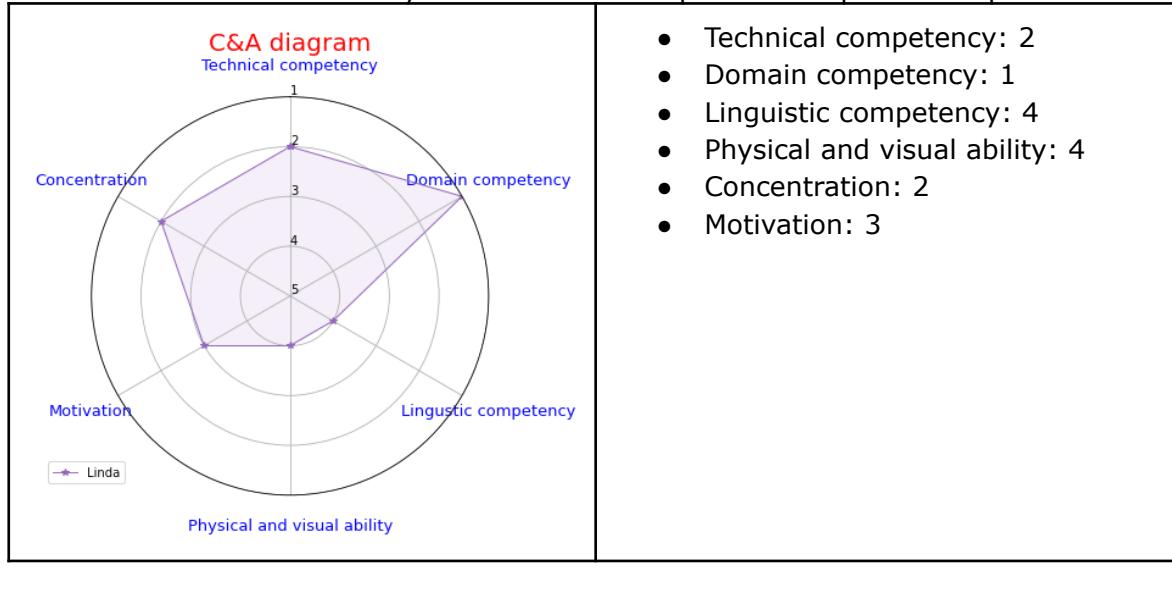
However, some problems start occurring soon: by the time Linda arrives at the chart page, Stefano realizes that she has just unintentionally added to the buying list a payment package for a not required service. Linda gets suddenly confused, and while Stefano cancels from the chart the unwanted package, she stops and tries to understand how she added that extra.

In order to proceed with the payment, it is necessary to log in or sign up. Since Linda does not immediately realize that she already has the old credentials she used when they put the first website online two years before, she instinctively clicks on "registrati". Then, again, her husband stops her and redirects her to the login page and completes the payment phase.

At this point, it is necessary to disable the automatic renewal by putting the old domain off. Linda scrolls the user panel and starts getting upset when she doesn't find an immediate command to deactivate the old domain name. So, as soon as her husband tries to find a solution, she gets distracted and stops participating actively in the task accomplishment. After some minutes of attempts, Stefano gets to the conclusion that the only thing he can do in order to anticipate the expiration date of the previous domain name is to switch from "automatic" to "manual" the renewal settings. Stefano tries to cheer Linda up, specifying that the procedure is counterintuitive also for him.

The last step to perform is now the redirection of the old domain to the new one. Linda is still confused, and tries to manage the problem going back to the user panel. She instinctively clicks on "Domains and DNS", but she can do very little more than that. Also in this case, she gets distracted and waits for her husband to help her complete the task. Eventually, Stefano understands how to redirect the old domain name to the

new one. Linda is relieved by the fact that the goal is reached. However, she feels really discouraged and she can not understand completely if the problem is due to her poor IT skills or to the website structure: indeed, she expected this task to be much easier and also somehow automatic. For this reason, she thinks that she could have been more autonomous if only there was a direct path to complete this specific task.



Here below, a global overview of all the four actors' positioning in the C&A diagram, based on the levels reached in each of the six influencing fields. The legend on the bottom left defines the color associated with each actor.

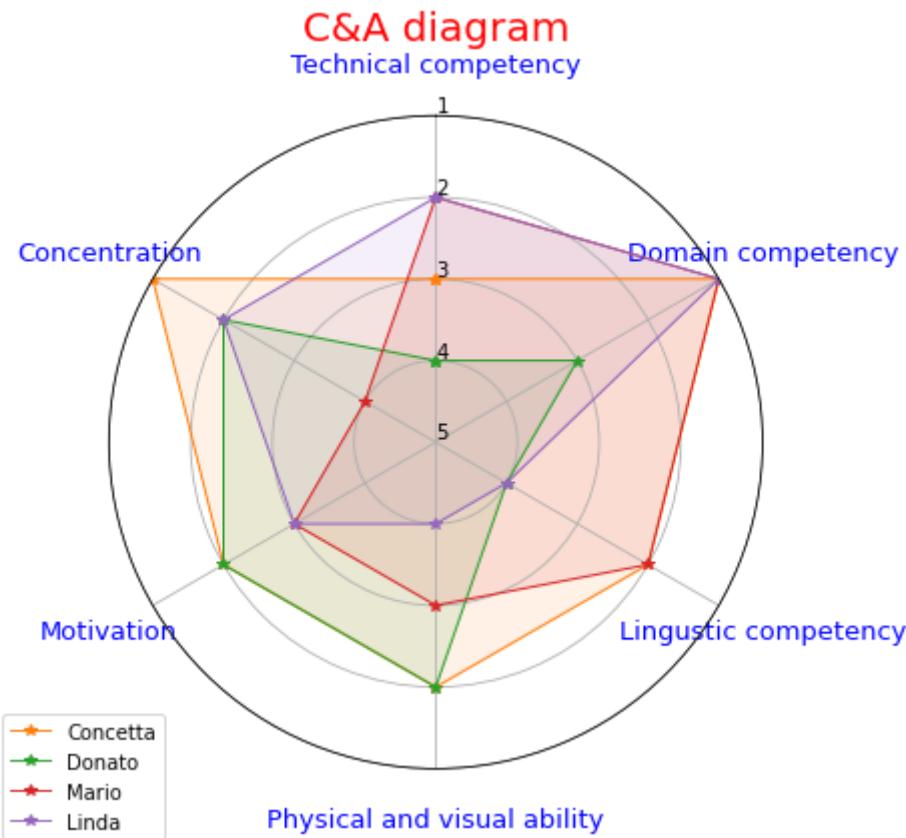


Figure 25. Overview diagram of technical competency of all the actors.

4.2.3 Operations

The operations are operations on the concepts, not on the data structures; so we want to detect in the existing system the terms associated with the concepts included in every command, every label, every widget etc. Operations are not system functions, but tasks interesting for the actors on the concepts, accomplished through the system functions.

The operations according to CAO = S are of four types:

- ◆ Creation: generation of one or more instances of concept in the initial state;
- ◆ View: display one or more instances of the concept in an understandable way;
- ◆ Update: modification of one or more properties of one or more instances of the entity, without creating new ones;
- ◆ Remove: removal of one or more entities from the system or from the attention of the user.

To describe the operations, we can refer to those characteristics of the operations which are specific to the category of operation they fit into (e.g., "creation"); but we can also describe them according to general characteristics independent of the type of operation.

Some general characteristics used to describe a property are:

- Simple: directly mapped to a system function;
- Complex: composed of two or more system functions;
- Repeated: consisting of the repetition of the same system function;
- Common: performed by most users;
- Rare: performed by a small number of users;
- Frequent: often performed by the same user;
- Sporadic: rarely or occasionally performed by the same user;

- Web-wide: part of a larger task that also applies to other websites (including search engines, competitors, etc.).

Category-specific characteristics to define an operation are:

- **Creation:**
 - ◆ Types: manual creation, automatic, implicit.
 - ◆ Default: if there are default values.
 - ◆ Multiplicity: can we only create one instance or many at the same time?
 - ◆ Persistence: the instance of this concept will exist after the end of the operation, or is it transient and related to the mere execution of the operation?
 - ◆ User memory: there are suggested values previously entered by the user?
 - ◆ Failure notification: when the system encounters a problem.
- **View:**
 - ◆ Full individual view: all properties associated with the concept are visible;
 - ◆ Individual reduced view; a few fundamental properties are identified, and displayed;
 - ◆ Multiple view (list): a reduced view of each item of the list is provided and it must be possible to perform operations on the list (sorts, groupings, filters, database searches, etc.). If possible for the user, it must be possible to create instances. Can be lookup (the purpose of the lookup is to select one or more instances of the concept for later use) or summary (facts grouped by concept are displayed together).
 - ◆ User Memory: are the filter, sort, and grouping criteria remembered from execution to execution?
 - ◆ Notification of success / failure: is there a way the system communicates success or failure of the operation?
- **Update:**
 - ◆ Global Update: all the properties of the instance are modifiable;
 - ◆ Specific updates: they depend on the type of updated value;
 - ◆ Multiple updates: how to distribute the same values on all updated instances;
 - ◆ Automatic functions: sometimes the update is connected to a system function (for example, sending the message). In this case, the success is that of the automatic function and not the update.
 - ◆ Notification of success or failure: is there a way the system communicates success or failure of the operation?
- **Remove:**
 - ◆ Elimination: the instance or instances exist no longer and are no longer recoverable;
 - ◆ Archival: the instance or instances are simply not available in general views, and require an operation on particular views;
 - ◆ Notification of success or failure: in the case of archiving, the path to access to the archived data must be specified.

In the following table are reported both the operations the user can accomplish through the function of the existing system and the operations achievable through the new functions of the system improved according to our proposal:

Operation type	Specific operation	Operation-specific characteristics	Characteristics
-----------------------	---------------------------	---	------------------------

Creation	Personal profile creation	manual, unique, persistent, user memory, failure notification, no default values	complex, common
	Subscription plan instantiation	manual, multiple, persistent, no user memory, failure notification, default values	simple, common
	Domain registration	manual, multiple instances, persistent, no user memory, failure notification, no default values	complex, common
View	Form to fill in	multiple view, no user memory, notification of failure (if missed blanks)	common, frequent, simple
	Chat for negotiation	individual reduced view, user memory, no notification	rare, complex
	Control panel (file manager)	full individual view, no user memory, notification of failure (if error occurs)	common, frequent, complex
	Online personal website view	full individual view, user memory, no notification of failure	common, frequent, simple
	Available domains view	multiple view (lookup), no user memory, notification of failure (if no results)	common, frequent, simple
	Services offered	multiple view (summary), user memory, notification of failure (if no results)	common, frequent, simple
	Subscription plans	multiple view (lookup), no user memory, no notification of failure	common, simple
Update	Language switch	manual, no notification of success or failure, global update	rare, sporadic, simple
	Add to cart	automatic, no notification of success or failure, specific update	common, complex
	Website files (through upload)	manual and partially automatic, notification of success or failure, specific update	common, complex
	Update the subscription plan	manual and partially automated, notification of success or failure, specific update	sporadic, simple
	Change type of renewal	manual and partially automated, notification of success or failure,	common, complex

		specific update	
	Redirect (same content but in different domain)	manual and partially automatic, full individual view, notification of success / failure	sporadic, complex
	Change owner	manual and partially automated, notification of success or failure, specific update	sporadic, complex
Remove	Personal profile elimination	elimination	rare, sporadic, complex
	Subscription cancelation	elimination	sporadic, complex
	Remove files from website	elimination	common, complex
	Cancel a registered domain	elimination	rare, sporadic, complex

4.2.4 Structures

The aim of this final section of the CAOS model is to understand how to design the data structures of the system to satisfy in the most direct and correct manner the constraints of view and navigation. Thus, to design navigation, consisting of access to the various parts, and, if needed, disambiguation pages and sorting.

To do so, the final realization of the CAO = S model is based on the construction of a three-dimensional table with concepts, actors, and operations as axes, and annotations on how actor A should be able to perform the operation O on the concept C within each cell.

The following diagrams present structures for each actor, related to the concepts and operations proposed in previous sections.

Actor 1 - Concetta	Create	View	Update	Remove
Domain				
TLD				
Hosting				
Subscription plan				
Website				
Owner		Form to fill in	Change owner	
Renewal				

Actor 2 - Donato	Create	View	Update	Remove
Domain	Domain registration	Form to fill in, Available domains view	Add to cart	
TLD		Available domains view (extensions)		
Hosting		Services offered		
Subscription plan	Subscription plan instantiation	Subscription plans		
Website	Website files	Control panel (file manager), Services offered, Online personal website view	Website files (through upload)	Website files
Owner	Personal profile creation	Form to fill in		
Renewal				

Actor 3 - Mario	Create	View	Update	Remove
Domain		Available domains view, Chat for negotiation		
TLD				
Hosting				
Subscription plan				
Website				
Owner	Personal profile creation	Form to fill in		
Renewal				

Actor 4 - Linda	Create	View	Update	Remove
Domain	Domain registration	Available domains view	Redirect (same content but in different domain), Add to cart	Cancel a registered domain
TLD		Available domains		

		view (different extensions)		
Hosting		Services offered		
Subscription plan	Subscription plan instantiation	Form to fill in, subscription plans	Update the subscription plan	Subscription cancelation
Website			Redirect (same content but in different domain)	
Owner	Personal profile creation	Form to fill in		
Renewal			Change type of renewal	

4.3 Interaction Design

Interaction design consists of describing, predicting and assisting the possible behavior of the user interacting with the system. In this way, the system is designed following the **user-centered design principles**: understanding what the user can do, what the user needs and in what context the user uses the system. Since we have used the CAOS model, we have chosen to follow a **goal-oriented approach**, which is aimed at taking care of the fundamental goal of the user; it eliminates non-relevant tasks, and focuses on the reasons to use the system rather than not; and the system is designed so that users have no need to learn the system, but just of making sure it is possible to achieve their goals through that system.

The following sections clarify which services are available and the organization of the functions of the system.

4.3.1 The dialogue

The interaction can be seen as a dialogue between user and computer. The choice of interaction style has profound effects on the nature of dialogue.

Menu and navigation

For reasons of space optimization, the navigation menu is organized hierarchically, some elements are hidden. In addition, this system makes it easier and more immediate to understand the main services offered, which can be used by the user without having to spend too much time, without being put in difficulty by too many types of actions.

Natural language

Natural language is required in order to use the general search bar. In case the user wants to do a specific search.

Cognitive load and sensory point of view

Our design aims to minimize the **cognitive** load of interactions. From a **sensory** point of view. In fact there are simple elements, well differentiated and stably positioned in the interface.

Example: the two global navigation systems are divided and reorganized between the services offered (hierarchical menu) and menus with functions such as assistance, change language. Visually it makes the contents better organized, the user is able to orient himself at first glance.

Another example is the possibility of adding filters in domain search, to improve search results.

While short-term memory is one of the 8 Golden Rules addressed below, regarding **long-term memory** we can say that it is not central to our ways of interacting, our approach is in fact based on sequential operations (step by step). The textual information is reduced to essential and short sentences. The user will be guided during the carrying out of a task. Example: during the choice phase (of a domain for example), the user is guided by a bar that indicates which is the current step and how many are missing at the end.

8 Golden Rules

Our design approach will be based on the 8 golden rules which are strategies for effective human-computer interaction:

1. **Consistency:** we use nice and familiar icons, the color palette recalls the main page of the category, a hierarchy of menus is maintained (example: domain, Italian domain, etc.), all making it easy for the user to apply the knowledge of the site by one click to another. Consistency plays an important role in helping users familiarize themselves with your product's digital landscape so they can achieve their goals more easily.
2. **Information feedback:** informative feedback was one of the parts we focused our attention on, especially in the shopping cart and final payment phase. It is important to provide feedback to reassure and make the user aware of the actions he is taking.
3. **Closure:** The closure has been added as a final message that assures the user that he has done his tasks well. We don't want to let our users guess and we also want to convey the feeling of making them move up a level.
4. **Simple error management:** strategies will be further explained in Chapter 4.3.4
5. **Shortcuts for expert:** strategies will be further explained in Chapter 4.3.4
6. **User's sense of control:** The site allows its users to be the initiators of the actions. The user has the feeling of being in full control of the events that occur in the digital space. It's all just a click away: you can change categories at any time, go back, etc.
7. **Short-term memory load:**
 - number of interaction elements no more than 7
 - dividere longers tasks in little steps responds to the same need

Example. One of the main tasks is divided into 5 steps:

enter your domain name, consult the results, choose whether or not to add an additional subscription package, view the cart summary and proceed with the payment.

4.3.2 Conceptual model

To give consistency to the site, we have thought of some conceptual models for it: one is a conceptual model for the main concepts involved in the project - those presented in section 4.2.1 Concepts; one is the structure of the system as we redefined it according both to the application of interaction design principles and rules, and the relations among the concepts highlighted in the first kind of conceptual model.

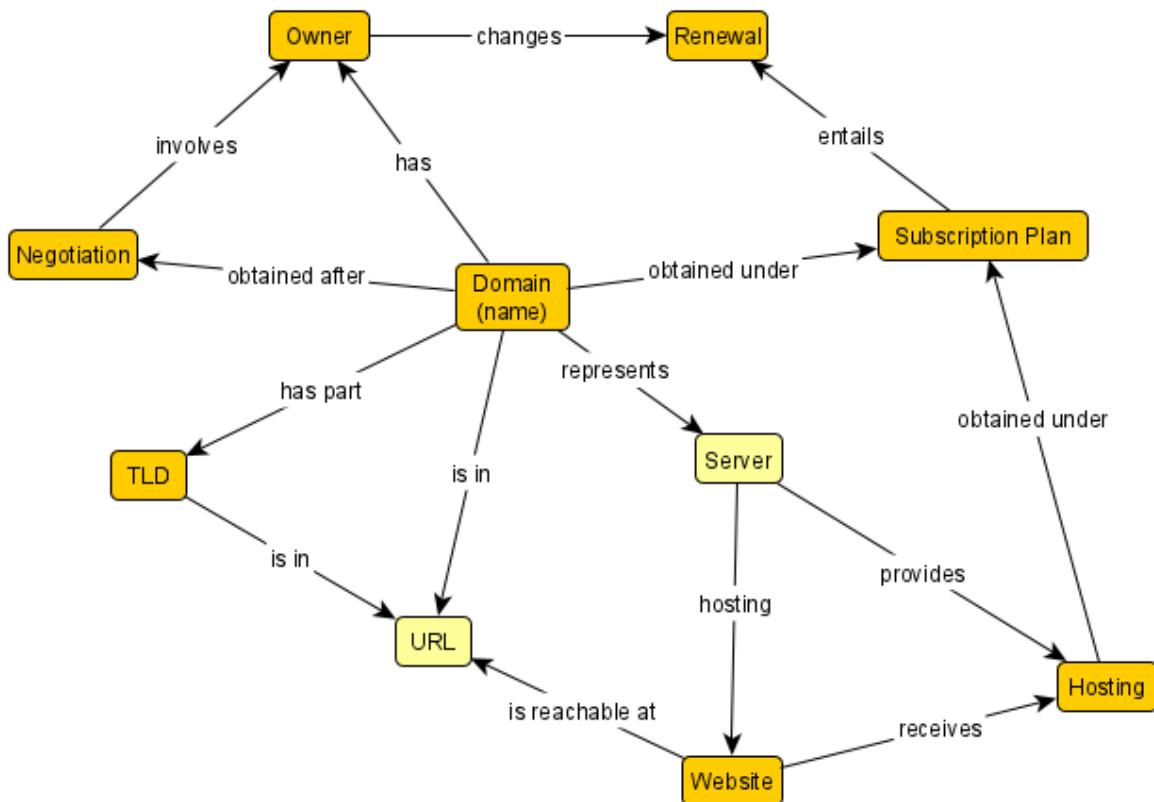


Figure 26. Conceptual model of main concepts involved in the system and ancillary ones.

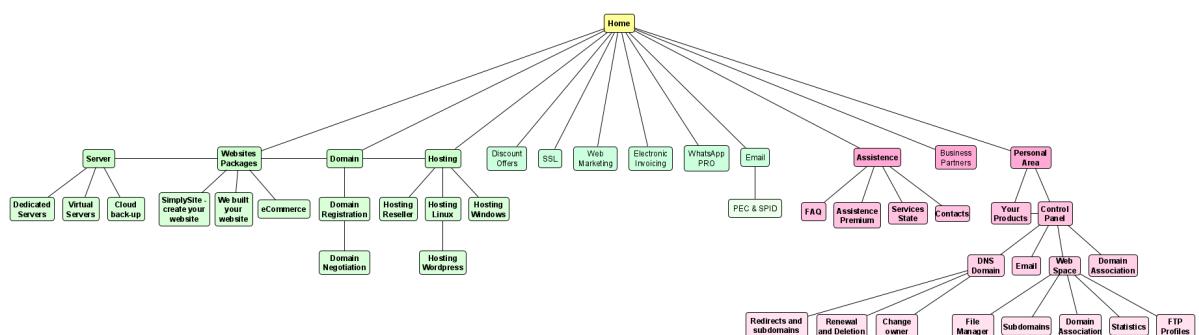


Figure 27. Conceptual model intended as the visualization of the hierarchical structure of the resource.

4.3.3 Naming conventions

The current development state of the web service we reviewed leaves consistent space for misinterpretation because of counterintuitive lexical choices, poor quality translations, too generic indications and incoherent internal redundancy. For this reason, we decided to define in advance a clear and smart naming convention to stick to.

According to the Purdue University definition, we define a A File Naming Convention as "a framework for naming files in a way that describes what they contain and how they relate to other files." The main aim of following a naming convention is that of limiting the possibilities for misinterpretation, both for the other team workers, for what concerns the files and folders semantic naming and hierarchical ordering) and for any kind of users (for the effective Effective UI Copy).

With User-Interface copy (UI copy) we specifically refer to labels, commands, labels in buttons, items of a menu, and other action-oriented elements in the user interface. Accordingly, since transparent command names foster a fast and painless interaction, allowing all users to move quickly through digital environments, we based our web service revision on effective UI copy. Following some well-stated conventions, we focused on the following points:

- 1) **command text:** short ,consistent and specific without sacrificing clarity. The concept behind the command will be expressed with the minimum amount of words, and in any case no more than 4. Verbal terms will be preferred to nouns in the cases in which the UI copy refers to an action to be initiated, and they will be followed by a noun object in the only cases in which it will be necessary for the seek of clarity, to make the command unequivocal. Branded or sectoral terms will be generally avoided: even if we consider as our specific target a group of people who are already at least minimally acquainted with the IT domain, we want to make the general paths comprehensible to the largest number of possible users. Indeed, this choice doesn't negatively affect our effective strictly conceived target group, while affecting positively all those potential users which are less used to IT lexic.
- 2) **Include tooltips to limit misunderstanding before an action is performed.** We will exploit tooltips activating on rollover to provide the users extra information about the nature of an action they are going to perform. For example, we will include tooltips to help the user understand whether the action which she is submitting or the field she is filing is mandatory or not before she potentially unnecessarily loses time. Further, we will also use additional tooltips to clarify the meaning of potentially misinterpretable terms, which in our user testing phase caused confusion and consequential delays in the tasks accomplishment.
- 3) **Describe the state to be reached, not the current one.** Analyzing the current structure of Register, we realized that some buttons, like the dropdown arrow in the "Your Account" area, represent the current state and not the one to be reached. This significatively reduces the usability of the website, since it results counterintuitive for most users. Accordingly, in our design proposal this aspect will be handled with more attention, so that all buttons and icons will be representative of the state reached after clicking, so as to follow the logical flow of the interaction.

- 4) **Follow conventions which are familiar for the users:** either visual or terminological conceptual models the user is already familiar with. In particular, we used as reference some well known interfaces, such as:
 - a) iliad: area personale
 - b) amazon: pagamenti e la fase di pagamento in genere che coinvolge: domain configuration, cart summary
 - c) facebook: posizione lingua, Invoices, possibilità di modifica con matita di fianco al campo corrente.
- 5) **Stylistic citations:** we drew inspiration from some visual conventions of well-known and broadly used online platforms. In particular, we used:
 - a) **pencil** icons to identify customizable fields, which the user is supposed to fill, like in Facebook Personal Information sections
 - b) typical and visually recognisable icons for the **social networks** links
 - c) **lens** icon for the search bar, which is commonly used in any research tool
 - d) **mail** icon for the email section
 - e) **question mark** icon for the Assistance Service
 - f) **world** symbol for DSN services

4.3.4 Handling errors

Handling errors is a crucial point in designing a system, since it is the projectual part in which it is handled the issue of how to correctly guide a user through a task she has to accomplish in the most efficient way.

In our design proposal, reinterpreting the guidelines proposed by the UUX expert David Travis in his *User Experience (UX): The Ultimate Guide to Usability and UX* course, we decided to address this aspect as follows:

- 1) **limiting the possibility of making errors.** This point can be associated with Nielsen's fifth heuristic, "Error Prevention", according to which a very good design can drastically limit the possibility that a user is misled in the path through the accomplishment of the task to be performed. Accordingly, we projected a structural design which is:
 - a) **as plain as possible:** so to minimize the user's possibilities of getting confused by an overburdened design with extra features placed at the same semantic and structural level of fundamental ones.
 - b) **non repetitive:** so that the path through which a task is meant to be accomplished appears clear, defined, univocal.
 - c) **intuitive:** we followed known naming conventions and familiar iconography which could lead the user to exploit previously acquired knowledge also in a platform which she sees for the first time.
 - d) **logically and hierarchically structured:** before developing the website wireframes, we implemented a conceptual model, which allowed us to understand how us developers conceived the various concepts to be either linked, nested or dependent on one another, and then we tried to realise a system design which was consistent with what emerged. In this way, the structure of the website should mimic the conceptual structure of the concept in the users' minds.
- 2) **helping the user understand the nature of the error made and suggesting a possible solution.** Here we are in the field of error diagnosis, recognition and recovery (i.e.: Nielsen and Molich ninth heuristic), in which the issue of inevitable

human errors is managed. What we wanted to achieve here was a minimization of the consequences of an already occurring error. What is important, indeed, is not that the user doesn't commit errors at all, but that the committed errors are perceived as non catastrophic, and generally recoverable. For this reason, we based our design on forgiveness and reversibility, in order to limit the consequences of the error we didn't manage to avoid through a smart design only. Indeed, our aim is to accurately avoid that the users feel discouraged toward the usage of the platform because they feel they aren't expert enough to it, ending in looking for alternatives in competitor websites. For the stated reasons, we decided to base our error recovery plan on safety nets based on the principle of the maximum seven steps: each mistake a user can make inside the platform should be recovered in seven steps at most. In order to do that, our system will provide smart error messages, which will clearly state the nature of the error in plain language (thus avoiding the use of codes, which result in confusion to non-expert users) and then guide the customer toward the solution of the problem itself. Further, the backward paths will be highlighted and it will be possible to go back from each page to the preceding one as naturally as possible.

4.4 Structure Blueprint

In this section we provide a blueprint drawing to define and represent:

- The component for the organization of the content;
- How these components are connected to each other.

The aim is to represent the Register system with respect to the information architecture, thus highlighting the navigation components of the subsite we are interested in, to show how browsing aids and search aids are organized.

Blueprint is about visualizing the structure and components of the system through a model that integrates those proposed in section 4.3.2 Conceptual model. Thus, it can be defined as a schema in which to clarify even better the conceptual model of the system, from the functions and navigation points of view.

In order to make our blueprint intelligible, we provide the corresponding legend.

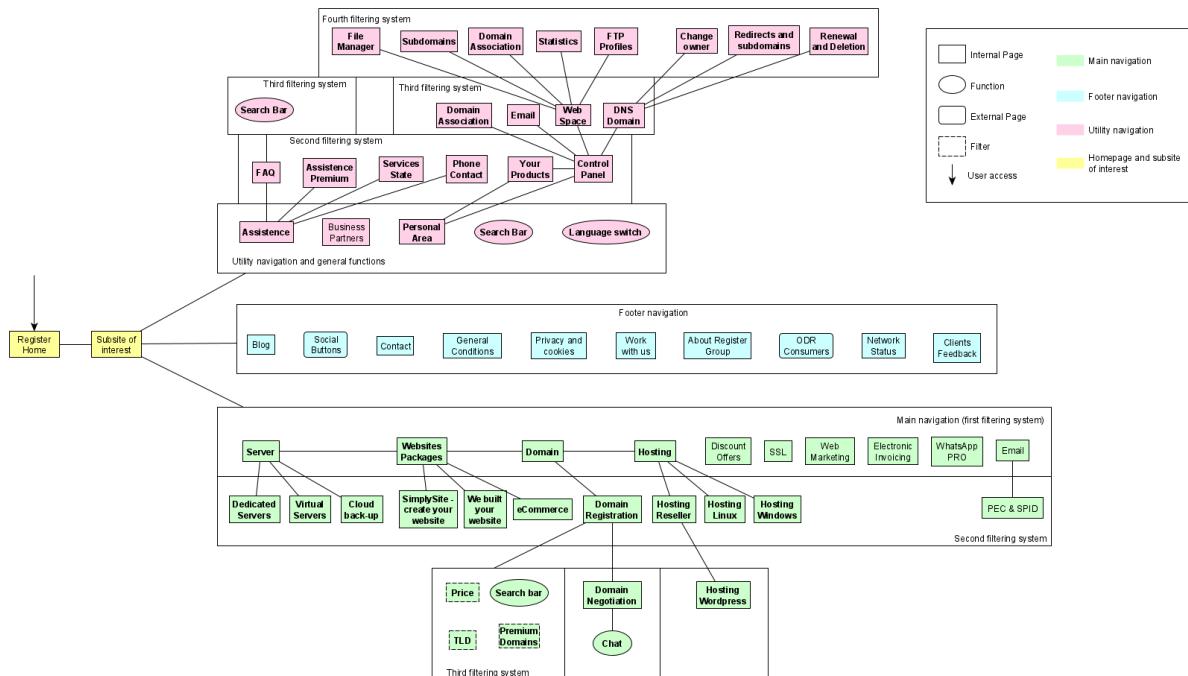


Figure 28. Structure Blueprint of our proposal prototype system.

4.5 Wireframes

Since wireframes are a visual guide that represents the skeletal framework of a website, thus they are created for the purpose of arranging elements to best accomplish a particular purpose, they have been developed as generic as possible when the content is obvious or irrelevant: squares instead of images, squibbles instead of texts, etc. We used actual blocks of text only when they were appropriate and relevant to point out significant changes in the system (e.g., a better explanation of what premium assistance is). All the developed wireframes are available in the document "Final Design Report".

5. Evaluation of Design

5.1 Inspection

To evaluate the design of the selected subsite of the Register system, the design team inspected the system. The internal inspection of the system carried out by the team itself is only one of the two methods to evaluate a design: the user testing, which is the other, external, method, is the object of the next section. The aim of this section is to outline easily noticeable improvements or to spot errors or slips which can be detected without the involvement of real users to test the system. The techniques relevant for this purpose are three: the cognitive walkthrough, the action analysis and the heuristic analysis. In the next subsections each technique will be illustrated to inspect the system as we designed it.

5.1.1 Cognitive walkthrough

A cognitive walkthrough is a fictional and step by step execution of a task, and the empirical evaluation of the likeliness of the fiction. We imagine the thoughts and actions of users when they use our interface to carry out a task for the first time. We tell a credible story describing each step the user must take while carrying out a task on the application; also taking into account the mood of the user interacting with the interface. The goal is to determine the plausibility of the usability of the interface for the chosen user segment. To create a CW we need:

- Wireframes, which represent our application;
- Description of a task;
- A complete and written list of the actions necessary to complete the task (called Happy Path);
- Description of the User and his / her skills and expectations.

Below we propose two different Cognitive Walkthroughs.

Rosabella and her brother Edmondo: change of owner assignee

Persona: Rosabella de Vito

Skills and expectations: Rosabella is not familiar with computers, even though she and her husband have owned one for several years. Rosabella has created a website to advertise and increase sales for her small home-made jam business, but for some time she has been more tired and unable to manage the website beyond the production of jams. Luckily, her gruff brother Edmondo proposed to help her, after several insistent requests from her sister. To make things simpler it would be enough to change owner assignee, so that Edmondo can manage and update the website from his home and from his PC, on his personal profile. Rosabella does not want to disturb her grumpy brother further, and expects to be able to change the owner of the domain without disturbing her brother and having to involve him excessively. She also expects it to be quick and easy, because she thinks it's just a matter of entering some data into a form to fill out.

Task: Change of owner assignee

Happy path:

1. she clicks on "log in", since she knows how to log in and access her website
2. she types her username and password
3. she clicks on the name of the domain she wants to change the owner of

4. she clicks on "dominio & dns" in the control panel, because by exclusion she realizes that what she wants to do is a change that concerns the domain itself as a product and its characteristics, not the files contained and manageable in the web space or the associations of different domains
5. she clicks on "change of owner assignee": she is happy that there is a specific button for what she wants to do and that it is placed clearly in the upper half of the page
6. she types the name of the domain
7. she chooses to verify her identity by video identification, since she has neither a digital signature nor a printer (required for the traditional method of identity verification)
8. she clicks on "permit access to webcam"
9. she then clicks on "record", after reading the short instructions written above the video player
10. she says the word written to verify her identity
11. she stops the recording and click on "send" to send the video registration
12. she is redirected to the previous page on Register where she has chosen the method for identity recognition earlier, and now she enters all the data relating to the new assignee of the domain
13. she eventually clicks on "send" to send the request: she will receive an email confirming the change of owner

Amilcare and his international business

Persona: Amilcare Ponchielli

Skills and expectations: Amilcare is 73 years old and has no computer knowledge or skills. His daughter gave him a computer a few years ago, but Hamilcare always used it very little, thinking it was a demonic and dangerous contraption. However, a few days ago at the bar, his friend Gioacchino told him that with websites it is easier to advertise your business and sell online, even abroad! Amilcare was suspicious, then he inquired and decided to try it too, because he is a man who still works in his shop of handmade bags and scarves, and above all he believes in challenges and does not give up easily. He chooses Register as a service with which to create his own website and, after several hours of research and study, he understands that to make a website with a personalized name as he would like, he must register a domain. He then decided to register several domains with the same name but with different top-level domains. In particular, he chooses to take the .fr, .it and .de extensions, because these are the countries where he ships the most bags and scarves. Amilcare expects that managing all these domains will be simple, that there will be a way to do the same action on different domains, because apart from the language, the contents it wants to upload are always the same.

Task: Manage multiple domains & domain negotiation

Happy path:

FIRST PART: REGISTER A NEW DOMAIN FOR EACH EXTENSION YOU WANT

1. Amilcare clicks on "domains" in the main navbar
2. He types the domain name in the search bar
3. He selects the extensions ".it", ".de", ".fr" in the filter section beside the search bar
4. he then press enter to search if the domain name is available
5. The domain name is available for only two out of the three top level domains that Amilcare selected. "BorseByAmilcare.fr" is not available.

SUB-TASK: NEGOTIATION OF A DOMAIN

6. click on "chat with the current owner"
7. after few messages, Amilcare is able to get the domain
8. after being redirected to the domain registration page, he selects all the three

- domains he is interested in since they are all available now
9. he clicks on "next"
 10. he clicks on "sign up" to create a personal account
 11. he fills in the form with his data, email and password
 12. he clicks on "next"
 13. he inserts card data entry (the payment method he chooses), after reading what webby the chatbot has explained about Register.it requiring this kind of data, even though the domain is free for the first year
 14. he confirms the card association on his card app
 15. he finally clicks on "next" to end the first part of the task.

SECOND PART: FILE UPLOAD

16. he is already logged in, so he access his personal area by clicking on the specific button in the utility menu
17. he clicks on the domain with the extension ".it" since he wants to start upload files for the italian website, which he consider more relevant than the others
18. he clicks on "spazio web"
19. he clicks on "file manager"
20. he is surprised and a bit relieved when he sees that he can select more than one domain to apply the changes he wants. This is great for him, because now he can upload the logo and some graphic images his nephew made for his business in all of the domains he now owns
21. he clicks on "upload"
22. he clicks on "select files"
23. he chooses the files he wants to upload on his computer and finalizes the upload

5.1.2 Action analysis

Action analysis is a quantitative analysis of the specific sequence of actions that must be performed to perform a task. For inspecting our prototype through the action analysis we have chosen to carry out an informal action analysis, which considers the number of atomic actions to perform. We decided which is a reasonable number of actions that the user performs on the interface to complete a task and evaluate globally in a case by case analysis.

Further, we have decided to take into account those tasks selected for the task analysis in section 1.2.3 Task analysis: the steps to carry out the task. The reason for this choice is pretty clear: since from the beginning of our work our aim was to simplify a complex task or to ensure that in any case the difficulty of the perceived task decreases, we have chosen to analyze the same tasks and their respective actions to see if actually we have simplified the tasks respecting the technical needs of the system and maintaining a semantic and content consistency with the original system as a whole.

So as in section 1.2.3 Task analysis, we have identified the context of tasks where our target user might use the Register website to register a domain and manage their files for their website; and the sequence of steps and user interaction between the website and other resources (digital or physical). We have used the **color blue** for those interactions external to the system.

Context and task	Steps (different paths are specified if they lead to the same task)
Change	1. click on "log in"

name of the domain*	<ol style="list-style-type: none"> 2. type your username and password or login method 3. click on the domain you want to change the name of 4. click on "go to domain & DNS" 5. click on "change domain name" <p>FIRST PART: REGISTER A NEW DOMAIN</p> <ol style="list-style-type: none"> 6. click on "domains" in the main navbar 7. type the domain name in the search bar 8. Optional: select one or more filters, related to the domain extension or related to the price range 9. click "search" or press enter 10. if the domain is found: and click on the preferred one; if instead the domain is not available retype another name in the search bar until you find an available one 11. click on "next" [select an optional subscription plan] 12. click on "next" 13. click on "sign up" or "log in" 14. select a signup mode or if you already have an account, login in within the website; otherwise start an interaction outside the website (e.g. access through Google account) 15. if you are already a customer: insert username and password; otherwise: click on "create new account" and the account will be automatically created 16. click on "next" 17. card data entry (payment method) 18. external interaction: card app 19. click on "next" <p>SECOND PART: CANCEL THE OLD DOMAIN AKA DISABLE AUTOMATIC RENEWAL</p> <ol style="list-style-type: none"> 19. click on the arrow 20. select "manual" from the dropdown menu <p>THIRD PART: REDIRECT THE OLD DOMAIN TO THE NEW ONE</p> <ol style="list-style-type: none"> 21. type the name of the new domain 22. click on "Verifica" 23. click on "next"
Change owner of the domain	<ol style="list-style-type: none"> 14. click on "log in" 15. type your username and password or login method 16. click on the name of the domain you would like to change the owner of 17. click on "dominio & dns" in the control panel 18. click on "change of owner assignee" 19. type the name of the domain 20. verify your identity by choosing one of the verifying methods: <ol style="list-style-type: none"> A. TRADITIONAL METHOD <ol style="list-style-type: none"> a. download and sign the request form for the change of assignee (sending the paper documentation is not necessary in the case of .com, .net, .org, .biz, .info, .mobi domains.) b. go back to your control panel c. click on the exclamation mark with a red background next to your domain name, in the column on the right

	<p>d. click on "maggiori informazioni" e. click on "Dati e Documenti del dominio" f. click on the link "Documento per Cambio Assegnatario". g. print and sign the document h. send the signed and scanned document (in PDF or JPG) as an attachment to the email address documentation@register.it</p> <p>B. VIDEO IDENTIFICATION</p> <ul style="list-style-type: none"> a. click on "permit access to webcam" b. click on "record" c. say out loud and clearly the words written d. click on "stop" e. click on "send" <p>C. DIGITAL SIGNATURE</p> <ul style="list-style-type: none"> a. choose one method of digital signature b. log in or sign in with the method chosen <p>21. enter all the data relating to the new assignee / admin.c of the domain 22. click on "send"</p>
Register a domain already taken (chat with the owner and negotiation)	<ol style="list-style-type: none"> 1. click on "domains" in the main navbar 2. type the desired domain name on the search bar and click on "search" or press enter [if interested in information about the current state of the website associated with the domain name, click on "who is the current owner"] 3. click on "chat with the current owner" 4. (type a message to start the conversation) 5. click on the arrow to send the message)* <p>*repeat until an agreement is reached and proceed with the registration of the domain (follow the steps of the task "Register a domain name")</p>
Manage multiple domains (even international ones)	<p>FIRST PART: REGISTER A NEW DOMAIN FOR EACH EXTENSION YOU WANT</p> <ol style="list-style-type: none"> 24. click on "domains" in the main navbar 25. type the domain name in the search bar 26. Optional: select one or more filters, related to the domain extension or related to the price range 27. click "search" or press enter 28. if the domain is found: and click on the preferred one; if instead the domain is not available retype another name in the search bar until you find an available one 29. click on "next" [select an optional subscription plan] 30. click on "next" 31. click on "sign up" or "log in" 32. select a signup mode or if you already have an account, login in within the website; otherwise start an interaction outside the website (e.g. access through Google account) 33. if you are already a customer: insert username and password; otherwise: click on "create new account" and the account will be automatically created 34. click on "next"

	<p>35. card data entry (payment method) 36. external interaction: card app 37. click on "next"</p> <p>SECOND PART: FILE UPLOAD</p> <p>38. click on "log in" 39. type your username and password or login method 40. click on the domain you registered 41. click on "spazio web" 42. click on "file manager" 43. select the domain you want to do changes of 44. click on "upload" 45. click on "select files" 46. external interaction: select the file you want to upload on your computer 47. upload</p>
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There are several system improvements both at the microscopic level (number of steps to be performed to complete a task) and at the macroscopic level (greater overall efficiency of the system). An example of the first case is task number one: the steps necessary to complete it have gone from 36 to 23. An example of the second case is task number two and number four: the number of steps to be done have not decreased but they have been chosen with greater accuracy, so that the user executes them only once to complete the task and not recursively (e.g. for uploading files for each single domain).

5.1.3 Heuristic analysis

The **heuristic analysis** (or use of guidelines) is the evaluation of a system based on a set of common-sense rules derived from past experiences. To evaluate our prototype system through an heuristic analysis we have chosen The **10 heuristics of Nielsen and Molich**. For each guideline we explain how we took it into account when designing the prototype and in which components or functions of the system it is now currently detectable.

- 1) **Visibility of system status:** the system should always keep the user informed about what happens, through appropriate feedback provided within a reasonable time and in fact the system we have modified informs the user about any action he has the possibility to do. For example, he always has the possibility to go back looking at the steps he has made reaching that page (Home > Personal Area > etc ..). Further, we decided to explicit the number of elements in the cart and we designed a line of steps in the domain registration process.
- 2) **Match between the system and the real world:** the system should speak the user's language, with words, phrases and concepts familiar to the user rather than system terms. It must follow conventions of the real world, and make information appear in a natural and logical order. On this we acted in a not too relevant way, the system had and has an appropriate language for each selected language. There have been some isolated cases in which we have chosen to modify Register's vocabulary, for example in the case of the assistance drop-down menu: we have replaced "help center" with "FAQ" as it is clearer than the contents of the page where the user will find himself again if he clicks on that button.

- 3) **User control and freedom:** since the user often chooses system functions by mistake, he needs clearly marked "emergency exits" to leave the unwanted state without having to go through a complex dialogue. Support undo and redo. This is a problem that our users encountered during the achievement of the task of purchasing a domain: at a certain point, selected the domain in the beginning, more than one domain, often not free but paid, is automatically added, in addition you get to a page in which there are other unnecessary packages for the purpose that the user wants to reach: therefore the purchase of a domain and that's it. At this point, which precedes the final purchase of the latter, the user is in confusion believing that he has selected one and the three packages that include a template of a site and other unnecessary things. Often within a page the navbar changed with respect to the home, not giving the user the possibility to go back.
- 4) **Consistency and standards:** users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform conventions. This point is very much in keeping with the "Recognition rather than recall", because the site originally appears rich in different sections and information but which actually referred to the same pages in terms of content. Even the Support mentioned several times is nothing more than a page with several links that refer to the whole site. We have minimized this by placing the user in a less confusing position.
- 5) **Error prevention:** even better than good error messages is a careful design which prevents a problem from occurring in the first place. Either eliminate error-prone conditions or check for them and present users with a confirmation option before they commit to the action. We have designed a structural project which is: as simple as possible, non-repetitive, intuitive, logically and hierarchically structured and what we wanted to achieve was a minimization of the consequences of an error that has already occurred. For this reason we have based our design on forgiveness and reversibility, in order to limit the consequences of the mistake that we have not been able to avoid only through an intelligent design. For further information read the paragraph 4.3.4 Handling errors.
- 6) **Recognition rather than recall:** minimize the user's memory load by making objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate. We worked a lot on this point: we minimized the point of the double navbar that referred to the same page, reducing the load of different names that led to the same concept (eg. In the "free" section there was also the "offers" section, which however was already present in the upper position of the double navbar).
- 7) **Flexibility and efficiency of use:** accelerators — unseen by the novice user — speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions. Through the keyboard which is an accelerator, the user can move around the site. By modifying the navbar we have made acceleration more immediate, eliminating duplicate sections.
- 8) **Aesthetics and minimalist design:** dialogues should not contain information which is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility. The problem with Register is that it contains little information, so it is

not particularly verbose, but often useless and not very exhaustive: it can be not very verbose and super exhaustive, guiding the user step by step in the difficult tasks that the site offers.

- 9) **Help users recognize, diagnose, and recover from errors:** error messages should be expressed in plain language (no codes), precisely indicate the problem, and constructively suggest a solution. On this front Register showed no particular problems, already having a fairly simple language.
- 10) **Help and documentation:** even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large. Here we had to intervene: the assistance of this site is almost non-existent, having a chat that appears only in certain pages and that once closed the user no longer has the possibility to reopen it (perhaps after having found some problems during the various steps).

5.2 User testing

Unlike system inspection, which is internal as it is performed by the team that developed the system, testing with the participation of potential external users is a method of evaluating a system that is external to the team of developers.

5.2.1 Definition of the testing protocol

As for section 2.2 User testing, in which we have tested the existing system of Register, also in this user testing of our prototype we selected **Discount Usability Testing** as the **method for testing** these resources. As mentioned earlier, this choice on the protocol also directly derives from the methodology, which is the **Thinking Aloud**.

In this step we have tested our prototype system, i.e., the wireframes we have designed, asking the participants to test the system with the same tasks we have defined in the first user testing of the existing Register system:

Task 1	Change name of the domain (registration of a new domain + deletion of the old one + redirection from the old to the new one)
Task 2	Change owner of the domain
Task 3	Register a domain already taken (chat with the owner)
Task 4	Manage multiple domains (even international ones)

The users selected to carry out the tests are **different from those selected for the user testing in the second section, to avoid biases**. We have selected participants **relevant for our target user segmentation** (they happen to be some of those selected for the interview in the Ethnographic Research):

User	Demographic Segmentation (age range, education, income...)	Psychological Segmentation (personality, values, attitudes, interests...)
Cristiana	She is 55 years old, and has a high school diploma (istituto magistrale). She is a primary	She is passionate about her work and really interested in discovering new methods to teach and improve her

	school teacher with 32 years of experience.	teaching skills. She is really involved in extracurricular activities and wants to collect money for charitable purposes.
Sergio	He is 60 years old and he has worked as an accountant for all his life since he graduated from accounting school.	He is a really hard worker and enterprising man. He is always open to new experiences, especially in the workplace, which he evaluates with seriousness and professionalism.

5.2.2 Tests summary

User 1 (Cristiana), **Duration of the test:** 1h24min; **Language of the test:** Italian.

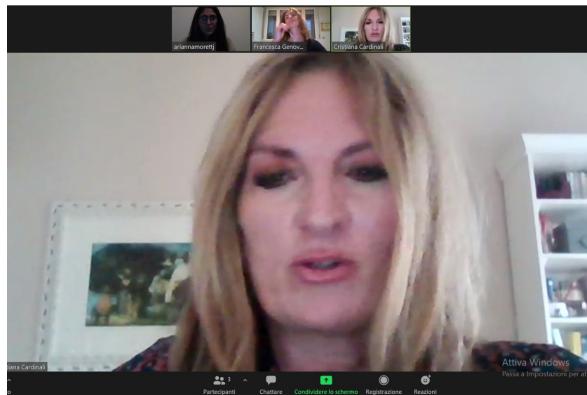


Figure 29. Screenshot of the online user testing with Cristiana.

Task	Actions and comments of the user
Task 1	<p><u>STEP 1: REGISTER A NEW DOMAIN (OPTIONAL)</u></p> <p>At the beginning, she immediately asks if it is possible to make the font bigger, so she complains about the dimensions of the features of the system. However, she notices the visual features and appreciates them: she immediately notices the presence of the chart. First of all she reads the homepage. She does not know what an extension is, so she needs a clarification. She spends some time looking at the images. She says that she feels like a requisite must be the knowledge of the English language, and she is confused by this fact. She scrolls the whole homepage before understanding that she needs to use the navbar. She eventually understands that she has to use the navbar: she was previously led to think that she had to click on the image. She is confused by the terminological choice: "search a domain", since she thought the domain was to "choose" and not to "search". She makes her selection and now she arrives at the page of the domain selected. She understands the ones that she selected because they are green. She thinks that she must click again on the green box. Anything happens, she understands that she has to click "next". She understands that she can freely choose whether to add an additional plan to the chart or not. She clicks again "next". In the summary, she is confused by the list of elements included. At the end she makes her choice, she understands that she doesn't have to further select elements but the presented ones are the ones that are included with the service. She notices Webby, the virtual assistant, and reads the text. She says that it is "reassuring". Now she starts thinking about how to understand whether it is a scam or not. She expected a reassuring sentence. She is giving her money and she wants some more guarantees.</p> <p><u>ACTUAL TASK: CHANGE THE NAME OF THE DOMAIN</u></p> <p>Once the domain is bought, she has to change the domain name. She focuses on the tips. She would have preferred the presence of numbers: it was not clear that the suggested steps are consequential. Furthermore, she does not understand that the</p>

	steps are not clickable themselves. She is confused. It was not clear to her that for managing her domain she had to click on the domain name. It is very small and nothing suggested the necessity to click on it. She neither reads the text at the beginning. In the end she clicks on it, but she would have preferred a clearer sub option for each possible activity and a fully clickable card, to understand that there is a section where she can do several things, listed below. Now she is in the section to change the domain. She understands the passage in which she has to buy a new domain name. She easily understands the necessity to switch from automatic to manual in the renewal method. "Verify" is not clear to her. Maybe we can add to the button something like "Verify the correctness of the information you inserted" above the button.
Task 2	We are back to the user area, she suggests adding visual stimuli to "drive her by hand". Maybe with a very visually identifiable arrow, sparkling for example. She understands she has to click on Domain and DNS. She clicks on "change owner/assignee". She reads the message, and she understands what is going to happen. She understands immediately that there are three options she can choose between. She is a bit confused about "indicate the domain name" but then she understands. She suggests highlighting somehow the fact that the data to insert is the one of the "FUTURE" owner. She clicks on the link to see the progression of the request. She understands the visual inputs and she understands the progression state. However, she is a bit confused about the fact that in the last box the message is positive, but it is yellow, and the status is on progress. The message should change accordingly and be explicit of the real status.
Task 3	When registering a new domain, she focuses on the not-available ones and she stops: she does not immediately understand the possibilities that she has, what she can do if the domain is not available. In the negotiation section she complains about the dimension of the fonts again. She immediately notices the lens and improves the font dimension.
Task 4	She understands that she has to access her personal area in order to visualize her registered domain and make changes. She is confused as she wonders if there is a way to select multiple domains right away to make changes. By exclusion she decides to click on one of the two example domains. On the page where she is redirected, first clicks on "domains and dns" and then on "web space", where she gets to the file manager. She really likes buttons and icons, but it takes a while to realize that she has to click on the domains she wants to change after reading the explanation. She says she doesn't understand the choice of colors.

User 2 (Sergio); Duration of the test: 1h2min; **Language of the test:** Italian.



Figure 30. Screenshot of the online user testing with Sergio.

Task	Actions and comments of the user
Task 1	<u>STEP 1: REGISTER A NEW DOMAIN (OPTIONAL)</u> Firstly, he complains about the dimensions of the font and he looks at the navbar. He immediately finds the "Domain" link. He inserts the name he is interested in the

	<p>appropriate search bar. We arrive at the next page. He selects the extension. The interviewer asks how many domains are selected, and he says five, but he is still confused about how many he is buying. He says he is a bit confused. He would have preferred to have only "cucina". And he would use the "red" / "green" symbology to signify the disposability. He understands how to add domains to the cart, but he complains that "add" is confusing. He suggests adding a chart symbol and the extended "add to chart". He understands that the package is optional, however he suggests adding a "skip" button, to highlight that it is optional. He arrives at the summary page. He does not see the price. When he sees it he complains about the fact that the transaction would be null. He suggests adding a line with the declaration of the date when the import will be taken from the card, with the exact amount of money. Then he does not exactly get why the postal payment should be separated from the credit card (since generally everything goes back to mastercard). He arrives at the personal area.</p> <p>ACTUAL TASK: CHANGE DOMAIN NAME</p> <p>He understands that he has to do another website for a redirect. The two boxes one at the side of the other are counterintuitive. He does not understand what to do and he needs help to get into the personal area. He clicks on Domain & DNS. He understands the step in which first of all he has to have the new domain. He stops on "change the renewal method to delete the old domain. He selects "manual". At the end he understands that he needs to delete the previous one. He suggests the change of name should come before the certification of the possibility to buy the new domain name. He says the color choice (yellow / green) helps. It says that it also helps the increased dimension of the font.</p>
Task 2	He clicks on "domains and dns". He complains again about the font dimensions. He clicks on "change of owner". He arrives at the "change owner" page. He is a bit confused about the necessity to re-verify the domain name. We explained to him that it was implemented in this way by register. He understands the structure of the identification step. He says that pec is not a synonym of the digital signature. Also he does not understand the affirmative message at the "in progress" step.
Task 3	In the case the desired domain cucina.it is not available, he firstly clicks on the link to have access to the information of the current owner. He then complains about the color combination. He thinks that it is really useful to have the possibility to get in contact with the other domain owner. However, he suggests keeping in touch by email, instead of by chat. He opens the chat anyway and he asks which one of the characters is he (note that he has never used social networks).
Task 4	He expects it to be a complex task, as as far as he knows it is usually only possible to edit one site at a time. He logs into his client area, and there he clicks on a random domain. He enters "web space" knowing that it is the only possible link if you want to manage the contents of the site. Arriving at the file manager page, he understands that there is the function of changing multiple domains only after reading the explanation. It suggests a more expressive graphic rendering, so that it is better to understand which domains are selected for changes.

5.2.3 Analysis of subjective and objective data

Since the discount usability testing provides suggestions for improvement, we have deducted from the tests that we should focus on the success of the task to understand the complexity of it and what is needed by the users to carry out the task.

Comments on success, errors, efficiency, learnability, problems:

User 1 (Cristiana)					
Task	Success	Errors	Efficiency	Learnability	Problems

Task 1	No	Yes	No	No	Yes
Task 2	Yes	No	Yes	No	No
Task 3	Yes	No	No	Yes	Yes
Task 4	Yes	No	No	Yes	Yes

User 2 (Sergio)					
Task	Success	Errors	Efficiency	Learnability	Problems
Task 1	Yes	No	No	Yes	Yes
Task 2	Yes	No	Yes	No	Yes
Task 3	Yes	No	Yes	Yes	Yes
Task 4	Yes	No	No	No	No

As it is stated in the tables above, we had an increased success rate and error-free rate when testing the prototype system with respect to the current system. However, there have been some minor errors and problems that lead us to the improvement of the prototype.

5.2.4 Conclusions: improvement of the prototype

After this testing, we reflected on the following issues and made the modifications to our wireframe. Indeed, we have accepted the suggestions of users who have tested our system and noted the problems encountered in the wireframes, dividing the latter and their respective changes according to the tasks in which they are involved.

Preliminar Task: Domain Registration

Highlighted issues or suggestions	Solutions or design implementations
All the tested users complained about the sizes of the font: they thought it was really hard to read some fundamental information.	Where possible, we increased the font size. In other cases we implemented a zoom system.
In choosing a name for the domain to search, one of the users complained about the terminological choice. She suggested that "search a domain" was misleading, since it made her think that she had to select something instead of typing the desired domain name.	We accordingly changed the sentence from "search a domain" to "type your domain name".
One of the tested users noticed that the green/ red symbology was misleading, since in the version of the design that he tested the green color was used to signify a selected domain name among the available one, while the red color was used to signify the non-availability of a domain. He suggested that we use a consistent symbology to oppose	For this reason, we kept the color opposition red/green to define the availability and non availability of a domain, while, in order to differentiate a selected domain from a not selected one, we exploited continuous and dashed borders and presence/absence of green ticks.

the availability to the non-availability and another symbolism to oppose selected / not selected.	
Even if all our users were able to add elements to their charts, one of them commented that the choice to limit the message to "add" was not exciting. Accordingly, he suggested adding a visual symbol and extending the sentence with "add to chart".	Indeed, we welcomed all the suggestions and we added both the symbol of a yellow chart and extended the sentence to "add to cart".
Although understanding that the selection of extra packages is optional, one of the users complained about the absence of a "skip" button next or below the "next" button.	We implemented a "skip" button to skip this step if the user doesn't want to add any additional package.
One of the users spent a consistent amount of time trying to understand whether she had to check which services she wanted to keep or not, among the ones already included in the offert summary before paying. She found the summary confusing because the elements were not grouped and because the word "included" was rewritten after each element of the offert.	We grouped the elements in a box and we highlighted that all the elements are included in the offert only once, before listing them.
All the tested users complained about the payment section. In particular, one of them would have preferred a reassuring sentence, while another of them highlighted the necessity to include a clear sentence stating the expiration date of the free period and the amount of money that will be paid with the chosen method at that moment.	A text caption has been inserted that reassures the user, which explains why making a payment on register.it is safe and compliant with current regulations relating to online payments. Furthermore, we added an alert message stating the expiration date and the amount of money which will be charged through the added payment method at that moment.
During one of the tests, a user asked why the postal payment was separated from the credit card, since generally everything goes back to the mastercard.	We welcomed the comment and we unified the two methods.

Task 1: Change Domain Name

Highlighted issues or suggestions	Solutions or design implementations
In this section, all of our users suggested improving the dimensions of the font of the clickable elements.	Where possible, we increased the font size. In other cases we implemented a zoom system.
All of the tested users complained about the lack of intuitiveness in the access to the personal area, and in particular to the specific domain.	The contents of this page were reorganized and all non-essential information was removed. Domain names were made more visible.
One of the users declared that she would have preferred a clearer list of sub options for each service provided, and maybe a fully clickable card instead of a link in the name of the service only.	We presented the four main services offered in the persona area in separated cards, we improved the size of the font of the sub-services offered and we presented these latter in a bullet list.

In this section, one of the users commented that the verb "Verify" alone did not represent to her a clear command.	We added an explanatory sentence, i.e.: "Verify the correctness of the information you provided", above the button.
A user thought that it was disturbing that the change of domain name came after the check of the possibility to buy the new domain.	We then changed the order of the steps: now the change of domain name precedes the check of the possibility to buy the new domain.

Task 2: Change Domain Owner

Highlighted issues or suggestions	Solutions or design implementations
When a user went back to the user area, she felt a bit confused and she highlighted the necessity to "drive by hand" the totally inexperienced users as she is. Maybe with a very visually identifiable arrow, sparkling for example.	We designed a system that guides the user in completing the task. In a special box the user can write the name of the task that she is not able to complete. The system uses a vocabulary that recognizes the keywords contained in the sentence typed by the user. Consequently, a guided tour begins: the idea is to help the user proceed in the correct way by highlighting the button she is supposed to click with a sparkling yellow arrow pointing at it.
All the tested users complained about the double request to verify the domain name.	Considering that at the point of providing the data of the future owner the procedure has already started for a specific domain name, which has also been verified once, we decided that the second check of the domain name was superfluous and we left it out.
A user intuitively started filling the form for the future owner with her own data. She then explained that she did not notice the command above, stating that she had to provide the information of the future owner and not her own data.	Accordingly, we highlighted in bold the word "FUTURE" and we turned it in capslock. Then we increased the font size of the whole sentence.
All the users notice an inconsistency in the page showing the progression state of the request: the last step was presented as "to be completed", and for this reason it was colored in yellow instead of green, and instead of the green tick next to the box we added a yellow clock. However, they commented that the affirmative sentence was misleading, since it was not automatic to understand that the acceptance of the request was still in progress.	We changed the content of the message, in order to give the idea of progress and incompleteness when the task is not fully completed. The previous message will appear only when the task is factually completed.
A user highlighted that "PEC" is not a synonym of "digital signature".	We defined more clearly that these methods are alternatives and not synonyms.

Task 3: Negotiate A Domain Name

Highlighted issues or suggestions	Solutions or design implementations
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During one of the user tests it came out that the color combination (blue of the link on the red of the box background) made it really difficult to read the command.	We changed the color combination, in order to emphasize the link message.
A user suggested adding the possibility to contact the current domain owner by email too, since he thinks the direct contact by chat is a bit invasive and inappropriate	Indeed, we added the possibility to directly send an email through a popup window of the mailing service, in addition to the already implemented chat.

Task 4: Manage Multiple Domains

Highlighted issues or suggestions	Solutions or design implementations
A user suggested making the color choice more consistent, suggesting also a more expressive graphic rendering, so that it is easier to understand which domains are selected for changes and which ones are not.	Colors and other types of graphic renders have been chosen to more clearly distinguish selected domains from unselected ones.

6. Conclusions and Final Recommendations

In this report we have documented the whole process that led us from the analysis of a problem of an existing system to a proposal for improvement of the system itself. From the beginning, the first aim was to define the perceived complexity of the task by the target users to change their perception to broaden the spectrum of possible users that Register could have. To change the perception of a range of users, it was necessary to intervene on the usability of the product and on the specific needs and expectations of this type of user. Ethnographic research and the assessment of existing resources have served this first partial purpose, therefore the involvement of target users in the evaluation, inspection and analysis of the system. In the second part of the report, however, we presented the synthetic part of our project, the constructive and creative one. From feasibility study to design proposal, we have progressively built our proposal following a user-centered design method, goal-oriented design through CAOS model and a top-down model. The involvement of the target user concerned the design of our prototype proposal of the improved system up to the evaluation: thanks to the user testing on our prototype, the opinion and the stimuli provided by the user were listened to and implemented in the final design of the prototype.

In particular, the evaluation of our proposal system also led us to confirm the achievement of the intended objective: users who tested our system spontaneously commented very positively on some parts of the prototype. However, there is always room for improvement: criticisms and suggestions have always been accepted if sensible and implementable, clearly we can hypothesize improvements that do not strictly concern the scope of the complex tasks that we have decided to take into consideration, and that therefore we decided not to implement at the moment, but which can be of great interest and relevance for future developments (e.g., the dubious usefulness or lack of clarity regarding some services offered, such as Whatsapp Pro).

Therefore we have proposed in this document a functional enrichment of the system (e.g. a chat for negotiation) but other enrichments can still be proposed regarding the functionality of the system (e.g. accepting other payment methods).

From the internal evaluation of the prototype system - i.e. the cognitive walkthrough, task analysis and heuristic analysis - we detected and adjusted in the prototype all the improvements we intended to make. The results obtained from the internal evaluation are therefore the following:

- There are two significant improvements on the system, of two different kinds, which are mainly detectable in two of the four tasks analyzed: **simplification of the sequence of steps and elimination of multiple paths to complete the same task** (when redundant or unnecessary);
- We have improved the **browsing and search aids**, therefore navigation in general, through systems such as bread crumbs and advanced search. We have invested in the **match between the system and the real world**, choosing to change the language used by the system in several cases. Creating a timeline of the steps necessary to complete a task we give the **user control**, but also the **freedom** to interrupt the purchase to finish it later thanks to the cart always present in the utility navigation. We have invested a whole section on how to **handle errors and on helping users recognize, diagnose, and recover from errors**. The choice of icons and words was accurate according to the principle that **recognition is better than recall**. We have **minimized the design**, making the page components much more flexible and efficient (e.g. eliminate duplicate sections in the dropdowns of the main navigation navbar).

The results of the external evaluation of the prototype, i.e. the user testing, can be summarized as follows:

- All users took significantly **less time to complete the tasks** on our prototype than on the existing system;
- **almost 100% success**, i.e. completion of all tasks without catastrophic errors, by all users;
- **greater rate of error-free test**: most of the errors detected were minor errors;
- There were anyway **problems**, intended as: thoughts and expressions of frustration or confusion of the participant; not noticing something that should have been noticed; misunderstanding the purpose or role of text, functions or sections of the system. From these issues and from the spontaneous comments of the user provided thanks to the Thinking Aloud method, we have derived the **solutions to be adopted to improve the prototype system**.
- We realize that these amazing results may also be due to the fact that **a simple prototype has been tested**, and not a truly complex and really implemented system. In any case, we are confident that results of this type guarantee a successful implementation of the prototype as the results that could be obtained even if they could be lower would still be better than those recorded by testing the current system.

Technically speaking, we also believe that this work can be further expanded with research and development in other significant components of Register's online presence. For example, a further improvement of the usability of the product could be the mobile application of Register that can accurately perform all or most of the functions that are available on the online computer site.

Further developments that we could suggest to our client may concern the resolution of those errors considered non-urgent, to be corrected in a second release, as explained in section 2.2.5 Urgency Curve. For example, expanding documentation and internally-provided help (error considered less urgent in the urgency curve, both for impact, frequency and persistence); or investing in other ways to address the error that we have identified as formation bias-related delay (error considered less urgent in the urgency curve for impact and frequency). Addressing these kinds of issues could lead to broadening the system's target user range by increasing the number of prospects.

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