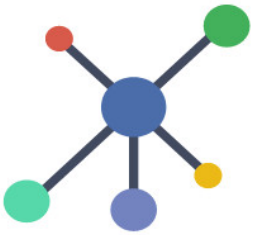

UNIVERSAL DESIGN STUDIOS

VOICE
Project Management Report

GoF

Great Design is a brilliant collection of beautiful ideas.

M. Cobanli

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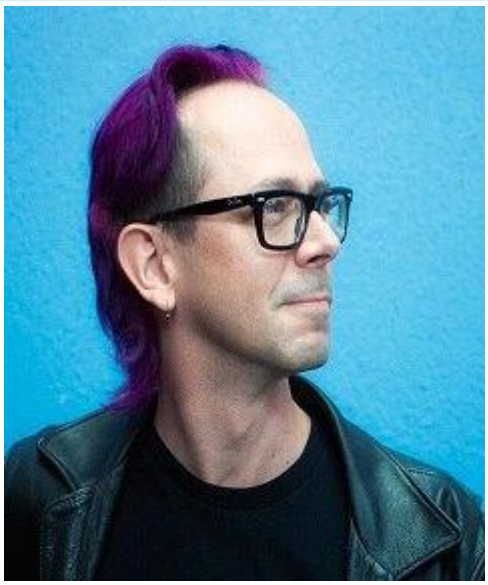

Mr. JJ. GARRETT
User Experience Designer

GoF is the name of our design team, chosen on purpose to pay tribute to the “Gang of Four” who gave us the “Design Patterns”.

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Introduction

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In this document we describe a project proposal for our target company that from now on we refer to as "the client". The aim is to convince the client for the importance of applying our design as a way to increase the market share and as a consequence the profit. This is done by a radical design and enrichment of the existing web page of the client.
In this work we have targeted a real, US based company to be our client. "Harris Communications" (www.harriscomm.com) is a well established, electronic device producer, specialized in audio and hearing products.
The goal of our design team is to persuade the management of Harris Communication to invest into a new line of products and services intended especially for the people with hearing disabilities or presumed hearing problems. Practically this is done by creating a new sub site connected to the existing website and by refreshing the home page of the existing site.
The design team called "Gang of Four" or shortly GoF consists of four members with different professional backgrounds varying from the Usability and User Experience Specialists to Programmers and Web designers. Our main goal is to apply the best practices and methodologies to the design of "Human-centered" products with a special focus to the usability and the user experience. We want our product to stand out from the rest of the competition in a very original way. This is achieved by taking care of user needs and goals, knowing that every product that we deliver has to fulfill one or more levels of the Maslow's Hierarchy of Needs (Fig. 1).

Fig. 1: Maslow's Hierarchy of Needs

In this context we want to reflect the Maslow's pyramid into the users pyramid of needs. In this new mapping the ground level correspond to the functionality. By functionality we mean that the interface must allow the user to complete his tasks in a reasonable amount of time. An interface that requires to much time for simple tasks or refuses to carry out proposed tasks will not be accepted.
In the second level we place the reliability, because we think that the proposed interface should be reliable in the sens that should not fail in the middle of a task execution. In the extreme case of a failure the interface must recreate the exact situation going on before the failure occurrence.
In the third level we place the usability. Of course this is our main focus, because nobody want to interact with a system that is hard to learn and difficult to use. Later on in this document we provide the usability tests carried out on our design to ensure that the usability criteria are met.
Last but not least is the pleasurable level. We apply an approach of emotional design because we want that the experience of using our product to be as good as possible. We want that the costumers of the product to get positive emotions and to talk about this product to other people. We consider the first impact with the product to be a very special moment that has to be kept in the memory for long time and at the same time we rely to the work of mouth for the further expansion of the product.
In the following chapters we describe in a very precise way all the actions and steps that have been undertaken to generate this document.
The first three chapters are dealing with the first two stages of the system life circle, namely feasibility study and requirements. Here we analyze the principal target users (the plot) and the secondary target users (the subplot). More precisely we employ techniques of user segmentation and user research to find out more about the target users and based on this data we generate the scenarios and create the personas. One important step in this phase is the assessment of the existing resources with the aim to find out possible problems in functionality and usability. This problems have to be collected, classified and then corrected.
The fourth chapter describes the design process. We adopt the CAO=S model of goal-oriented design. In our design process we visit all five levels of the Garrett's models and for every level describe our choices and decisions.
The fifth chapter contains the evaluation process. We conducted both internal and external evaluation and the results will be shown in this section.
Chapter six is dealing with some final considerations and the terms of use of the proposed system.

Chapter 1

Ethnographic Analysis

This chapter deals with the ethnographic analysis, that is the mining of our users needs and goals. In order to create something that is easy to use and pleasurable to interact with we have to know as much as possible about what drives the users to use our system; namely their needs and goals. To do this we apply two methodologies: Segmentation and User Research.

Segmentation

We define the segmentation as the process of dividing the whole group of users into subgroups based on similarities and common features. At first glance our original user group seems to be vast and very heterogeneous in all the demographic and psychological components of the possible segmentation; for example the age, the educational level, motivations etc. The best approach is to follow a step by step process.
We claim that our starting point is the whole target group composed of all the members of the population that have a proved hearing deficiency or is suspected to have hearing health problems.
Our demographic segmentation is based on the age criteria. This decision is justified by statistical research and medical data. According to ISTAT (www.istat.it)* the number of people that declare to be affected by a sensory deficit connected exclusively to hearing is 1 million and 198 thousand, (2.0% of the whole resident population of Italy, 60.209 million as 2013). There is a slightly difference in percentage in the gender distribution, where 53,3% are female or 638 534 individuals and the rest 46.7% are male or 559 466 individuals.
Interesting in this population is the fact that 74% of the members are older than 65 years. The geographical distribution of members is balanced between the North-West and the South of the country.
Another important data that this survey reveals is the education level of the group members. According to this data only 3.2% of the members have a University degree at least in bachelor level. The 83.% of the members have at maximum a primary school degree. The remaining 13.8% consist of members under having a secondary school degree. Table 1 summarize this data.

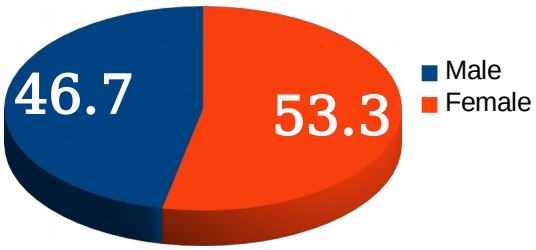
Table 1- Population having a hearing problems in 2013.

Presence of Hearing Problems	Absolute values	Percentages
YES	1198000	2.0
NO	59011000	98.0
TOTAL	60209000	100.0

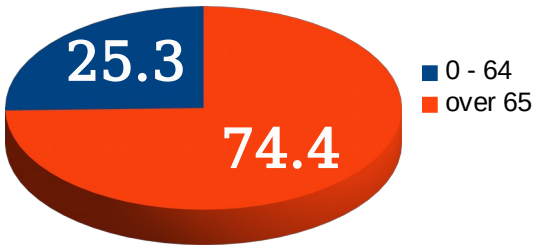
The following pie charts in Fig. 2 represents the geographic, age, gender and educational distribution of the target population.

* "STUDIO SULLA POPOLAZIONE DI PERSONE CON DISABILITÀ SENSORIALI E PLURIMEIN CONDIZIONI DI GRAVITÀ". (http://www.condicio.it/allegati/221/LegaFilodOro_RicercaISTAT.pdf)

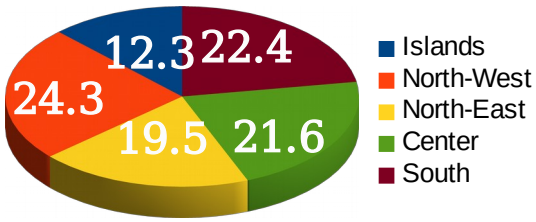
Gender distribution



Age distribution



Geographic distribution



Educational level distribution

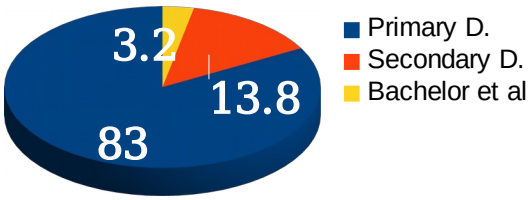


Fig. 2

This survey reveals many other factor related with general health of the individuals, for example 22.6% of people with hearing disabilities exhibit even motor and sight disabilities decreasing their quality of life. Considering the quality of life, the 25.3% of the individuals declare to be compelled to stay at home, the 20.8% to have problems to achieve basic every-day goals.
This data are very important to our segmentation process because permit us to create a more precise view of the target group and the relation of age to the hearing problems. Also we have to keep in mind that this statistical data are important even to the next phases of processes of the design, especially the other factors of the demographic analysis; the educational level and the gender distribution.
By consulting the medical data found on the web we reached on the conclusion that the age is most important indicator related with the hearing health. This is due to the natural decline of the physiological condition of the body.

Some other factors related with the hearing health are the increased number of other health problems that are observed in certain age groups. This means that people having health issues concerning diabetes, blood pressure or other cardiovascular diseases are more susceptible of hearing diseases to. Even smoking is a factor that influence the hearing but this can be viewed as a lifestyle aspect that we will see later on.

Having analyzed the statistical and medical* data we are now ready to construct our demographic segmentation, but before this we have to do an important consideration.
Is extremely important at this stage to make a distinction between the "consumer" and the "costumer".
The consumer is the one that uses or consume our product, we can call it the end user.
The costumer is the one that buys our product but he may or may not be the end user. What is this means? In simple words there may be someone that buys our product or service for another person, for example a father buys a hearing device for the teenager son or daughter.
We start by creating 4 segments of consumers based on age:

1. Age from 0 to 18 years old.
2. Age from 19 to 44 years old.
3. Age from 45 to 64 years old.
4. Age from 65 to 83** years old.

Considering that 2 of 3 individuals exhibiting hearing loss are over 65 years old we should make this cluster the most important one for our design but here rise the problem of technology impairment. We consider that the vast majority of the individuals over 65 year old may deal with practical problems using modern technologies such as laptops, desktops, smart-phones, or navigate to the Internet.
The first cluster that holds the individuals from 0 to 18 years old is a group with many potential consumers that we cannot consider like users because arise legal issues. We think that a teenager should not be allowed to buy on-line products or services. A parent has to do this kind of acquisitions.
In this sense a teenager is allowed to enter the site to view the information material, to make hearing test and to submit questionnaire and forms but not to buy or fix appointments.
At this point our two most important clusters (segments) are the second containing the individuals from 19 to 44 and the third one that contains the individuals from 45 to 64 years old. Statistically speaking, in this two groups the second group (age 45 to 64) is at higher risk to hearing loss than the first one (age 19 to 44).

---

* Sources: WHO (World Health Organization): http://www.who.int/pbd/deafness/news/Millionslivewithhearingloss.pdf?ua=1

** Average age in Italy as 1st of January 2018.

Here is a graphical representation of the demographic segmentation process.

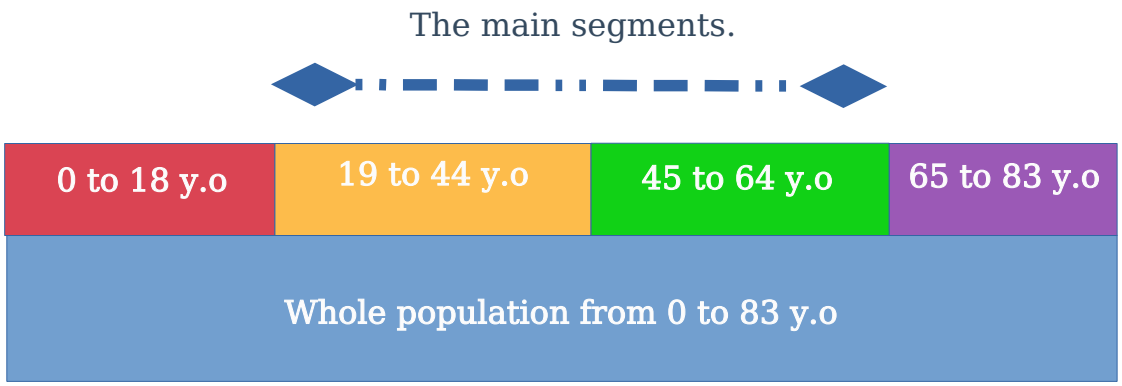


Fig. 3 : Demographic Segmentation

At this point we have two main segments to work with. As you notice this segments are very big and contain a large number of individuals. We can go on and further divide the two segments applying to them a psychological segmentation, considering factor like lifestyle or interests. In this case one can see new subgroups emerge from the already existing ones. For example we can have a fictional character described as follow:
“ 27 years old bartender, driving a Ducati and conducting an unstable life ”.
Just this example can divide our first original segment but at the very end we should be able to unify the two segments producing the original one.
We can do other considerations of this kind to the segments but as we try to produce new segments the whole process gets out of focus and the final result doesn’t change.
Now that we have stabilize the segments of our target user group we have to verify that this segmentation is the right one. How do we do this?!
Firstly we have to get to know our users. Techniques like User Research help us in this task.

User Research - Market Research

In order to better understand the users and their goals and objectives we have to know them better, to know who they are. To get some result in this task we make use of a survey. The survey in our case is an on-line questionnaire with questions about the user and the hearing related health problems. The survey has the following questions and has as target mainly the two basic segments but does not exclude the remaining user segments. The results are shown as well.

Survey: Google Form (https://goo.gl/forms/6MllVKuSJOkNskqa2)

Question 1: In which age range do you belong?

> From 0 to 18 years old
> From 19 to 44 years old
> From 45 to 64 years old
> Greater than 65 years old

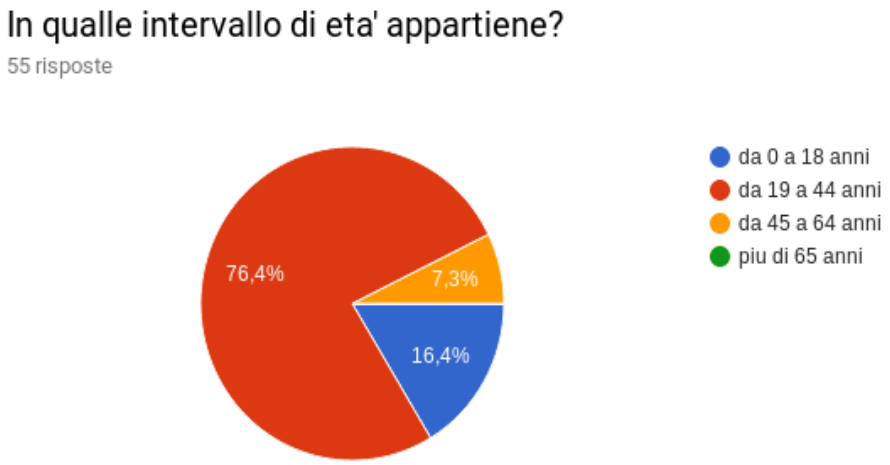


Fig. 4: Age groups chart

Question 2: What do you do in you life?

> Free one line text

We had a variety of answers regarding this question. We had users that declared to be workers, students, engineers, doctors etc.

Question 3: From one to ten how do you evaluate your relationship with the technology and the web in particular?

> 1 2 3 4 5 6 7 8 9 10

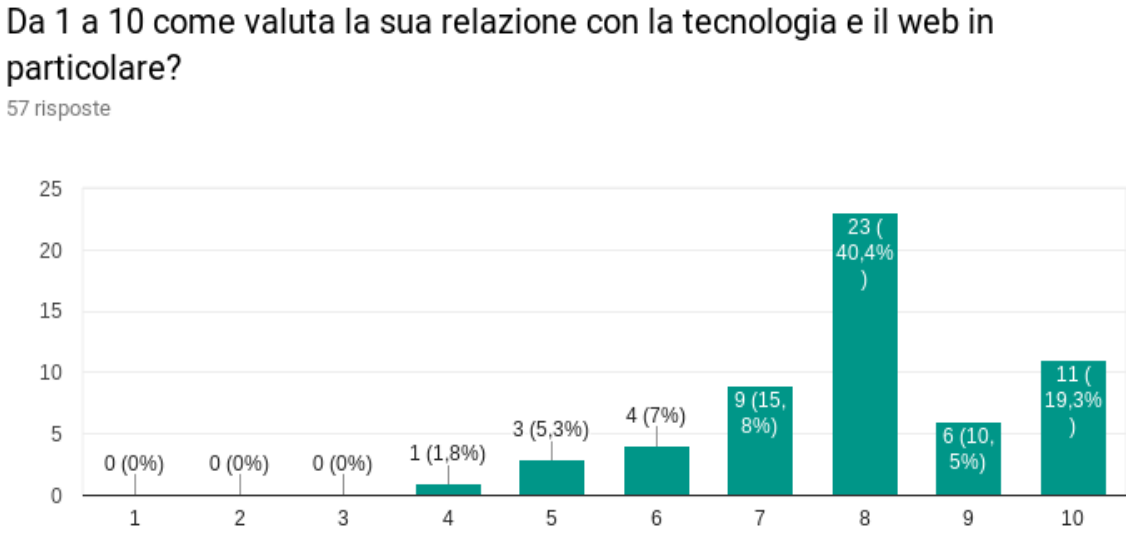


Fig. 5: Familiarity with technology chart

Question 4: What is your school level?

> Primary education
> Lower secondary school certificate
> Upper secondary school certificate
> University degree
> PhD or other post-bachelor specialization

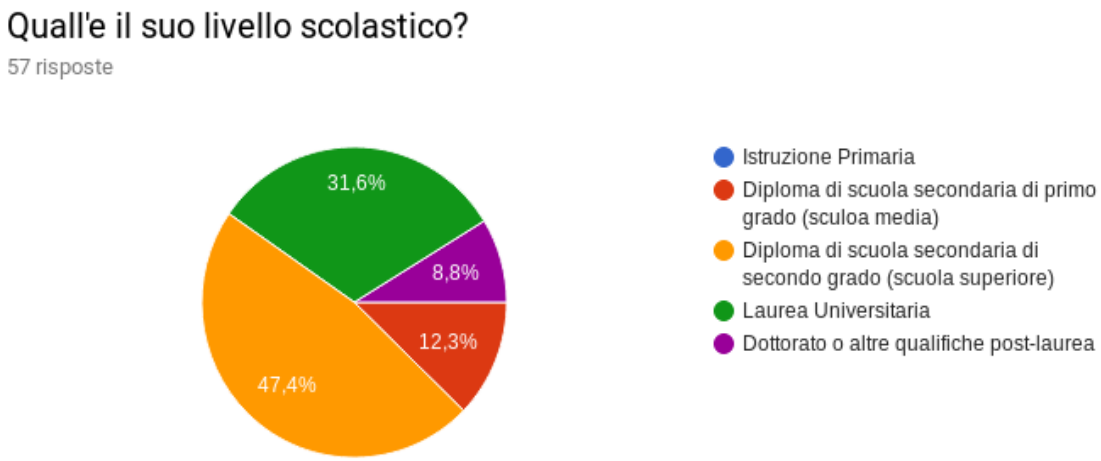


Fig. 6: Schooling level chart

Question 5: Do you live in a big city or in a suburban area?

> Big City
> Suburban area

Fig.7: Residence chart

Question 6: Smoker?

> Yes
> No

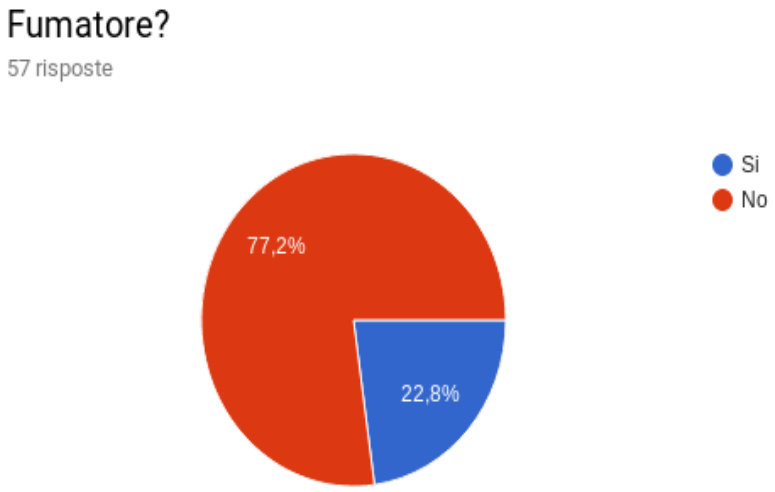


Fig. 8: Smoking chart

Question 7: Have you ever heard about Tinnitus, hearing loss or Presbycusis?

> Yes
> No

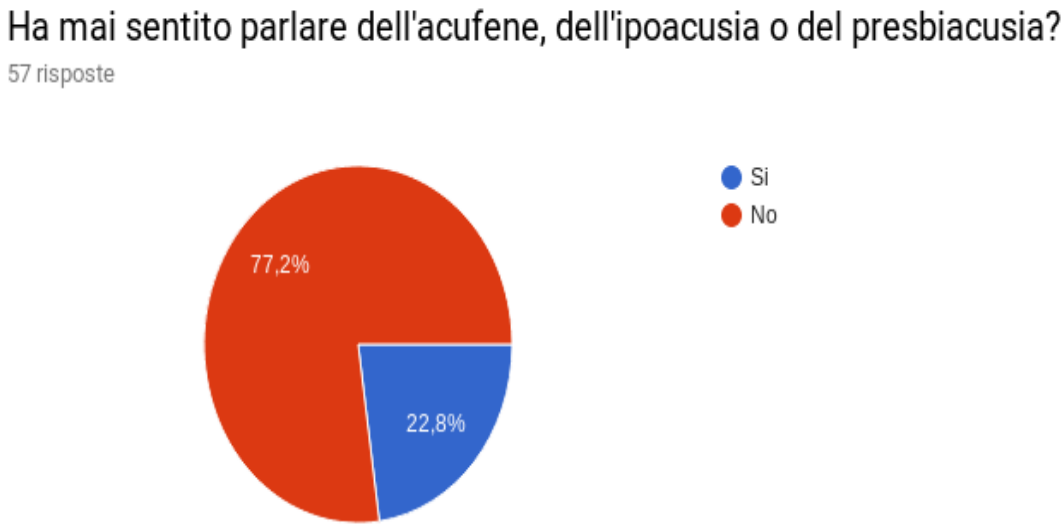


Fig. 9: Hearing diseases chart

Question 8: Knowing that 37% of people with hearing problems are not aware of the fact would you be willing to take an on-line hearing test or visit a specialized center?

> Yes
> No
> Maybe

Fig.10: Information chart

Question 9: In your family or group of friends there is somebody who uses a hearing aid?

> Yes
> No

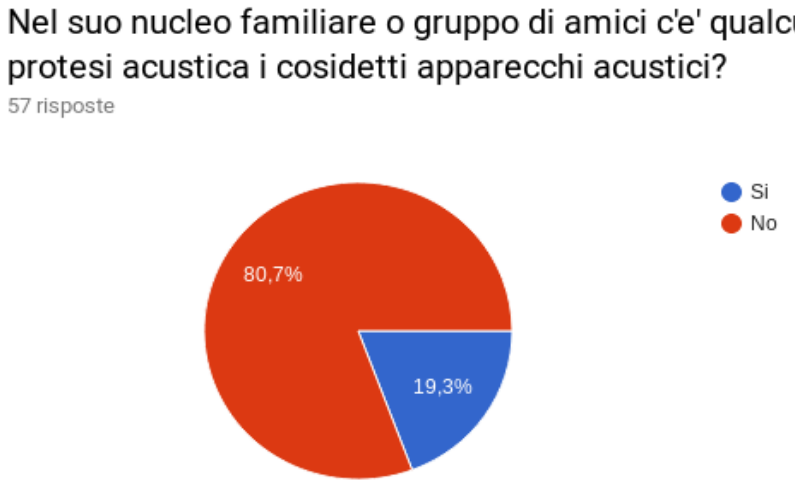


Fig.11: Familiarity with people that uses hearing devices chart

Question 10: Sex

> Female
> Male

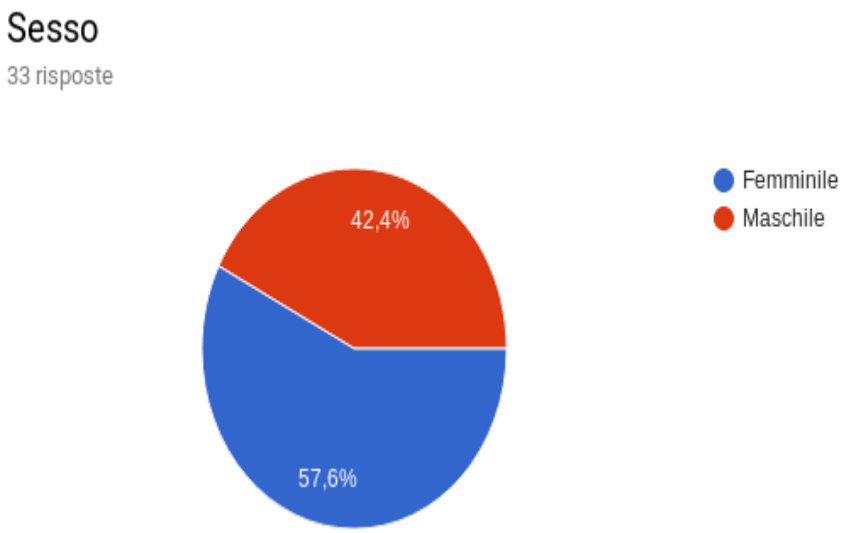


Fig.12: Sex distribution chart

As you can see there are 10 questions, some of them are very general having to do with demographics the others are related with the hearing health.
Of course this form is an on-line form and everybody can answer the question in total freedom without any kind of external influence. The questions are arranged in a random order, this means that every new user will see a different order of the questions.
We uploaded the questionnaire Sunday the 4th of Mars 2018 and maintained it on-line till the 11th of Mars 2018, exactly one week.
The results of the survey are a very important source of information for the design team. At this point the next step that we have decide to do is to get to know better the users in a very direct manner by interviewing them.

User Research - Contextual Inquiry

" Contextual Inquiry refers to a whole set of methods that, collectively, form the most powerful and comprehensive toolkit for understanding your users in the context of their everyday lives (hence the name)... "
The elements of user experience - J.J.Garrett

As Garrett highlights Contextual Inquiries are a first order methods to acquire information by direct interaction with the users in their "habitat". Keep in mind that any possible design of an application without considering the context of use will have a dramatic impact on the outcomes of the whole user experience. We do not want that to loose users!

The team decides to conduct a number of interviews to learn more about users and their possible context of use of our design.
Now the question is, how are we going to conduct the interview?
Based on the information gathered until now using the methods illustrated previously we were able to create a list of questions to be asked to our main segments. The idea is locate a number of individuals from the two segments and to interview them. The goal is to learn as much as possible about their habits, daily life, work conditions etc. We have compile the following list of questions.

Question 1:	Are you connected to the Internet in your work space?
Question 2:	Do you have an Internet connection and Internet enabled device/s at home?
Question 3:	How much time you spend on-line usually?
Question 4:	Which is/are the website/s you use most?
Question 5:	What you dislike in your favorite website/s?
Question 6:	Usually you use a Computer or a mobile device for your on-line searches?
Question 7:	Your working place is a quite or a noisy place?
Question 8:	Are you married and have children's?
Question 9:	You use the Internet mainly at work or at home?
Question 10:	What kind of music do you listen?
Question 11:	Do you use headphones when you listen to your favorite music?
Question 12:	Do you shop at Internet?
Question 13:	Do you use your Computer to stream on-line movies?

Summarizing all, we interviewed ten people all from the region of Emilia-Romagna, four of them from the first segment (age 19 - 44 years old) and six from the second segment (age 45 - 64 years old).
We analyzed the audio records of the interviews to get some information related to the context in which our costumers will use the website that we are going to design. Here is a short recap of their answers.

Question 1: At this question all the individuals answered positively. The reason for this is that the question was very general and did not specified type of Internet connections or devices used to connect to. All the individuals that we asked have a personal mobile device with the possibility to connect to the Internet and they use it in certain moment at the work. In some other cases, especially the individuals that worked in close spaces like offices for example they had at their tables a desktop computer connected to the Internet that they used frequently to get through they daily duties. The individuals from both the segments had a reasonably good familiarity with a one or more types of electronic devices able to connect to the Internet. Not surprisingly the individual in the first segment, age 19 to 44 years old and the ones with higher schooling level had a much higher level of competencies in the different types of devices, from example: smart-phones, tablets, desktop and laptop computers etc. They were able not only to use them but in some times to troubleshoot some connection problems.

Question 2: Even here the answer was positive, mainly because most of the individuals live with their family and some of them have children's that use the computer for study or for other activities. Some the individuals had more than one devices capable to connect to the Internet. All the individuals we interview had a good Internet connection at their homes.

Question 3: The answers at this question were different based on the lifestyle of each individual. There were students and youngsters that spend a lot of time on Internet and there were older people especially the second segment that spend not so much time on the Internet. We had a average of 2.8 hours per day for the first segment, age 19 to 44 and an average of 1,2 hours for the second segment.

Question 4: We had a big variety of answers regarding this question. We can classify the answers in five categories. First we have the social networks like Facebook, Instagram etc, second we have the news related websites like Rai, Tg7, Repubblica, Il Carlino etc, third we have sport related websites like La Gazzetta dello sport and diretta.it, in the forth place are the shopping websites like Amazon, GearBest and others, and in the fifth place are the institutional and the work related websites like "comune.bologna.it", "unibo.it" etc.

Question 5: The main elements that the interviewed individuals looks to dislike are the graphical elements like the color scheme of the websites, the graphical arranged of the menus and sometime the pop-ups and the advertisement adds. For example one of the guys we interviewed said that for him was very annoying the fact that he had to wait and view 15 second of advertisement before the real video of the sport event he was interested to effectively start.

Question 6: To this question more than 80 % of the interviewed admitted that use a mobile device for the search on Internet and few of the interviewed said that this depends on the place where they are at a specified moment. Usually at the office or at home, having a laptop or desktop in front of them they prefer to use the computer. This fact has to do with the physical and ergonomic ease of use of a computer for on-line searching.

Question 7: At this question the majority of the people said that their working place is a quite place and sometimes moderate level of noise caused by external sources like cars or other people working.

Question 8: The majority of the people we interviewed were married with one or more children. Exceptions here are the students and people under 25 that we interviewed.

Question 9: Mainly the interviewed individuals used the Internet at home or outside the work.

Question 10: Here we had an vast array of different genders and types that we assume that has to do with different personalities and character of the interviewed individuals. We claim that age is the most important indicator for the music preferences.

Question 11: At this question mainly the young individuals said that they use headphones to listen to the music or to speak to phone especially when their hands were busy. This were the case when they drive the car or studying in a library. Older people said that they had not much time to listen the music at the phone.

Question 12: Interestingly the individuals with a low schooling level belonging to the second segment, age 45 to 64 years old had no experience of on-line shopping and sometime they were "afraid" of providing their credit card credentials to an on-line shopping website. Young people belonging to the first segment admitted that they use to shop very often on-line. This is due the confidence that they had acquired in the use of the Internet and the reach on-line possibilities to buy anything, especially the the technology related items. Professionals belonging at the second segment, age 45 to 64 were very familiar with the Internet shopping and they used mainly to buy items related with their working activities, for example an old lady around 60+ years old working as a journalist used the on-line shopping to buy train and plane ticket for her travels around Italy and Europe.

Question 13: We used this question as an non invasive way to understand the speed and reliability of the Internet connected they had at home. The answers were all positive, independently of the age groups they belonged.

User Research - Task Analysis

"Task Analysis is a method of closely examining the precise steps users go through in accomplishing those tasks. This examination can be done either through interviews in which you get users to tell you stories about their experiences or through direct observation in the field, studying the users in their natural habitat."

The elements of user experience - J.J.Garrett

The team has choose to follow the second method, the *"direct observation of the users in their habitat"*. We provide to the users a number of tasks that they have to execute using their Internet connected device.
The place where this interaction happened is the users "natural habitat", meaning their office or their homes. We have arranged this appointments by choosing eight people that we consider to be representatives of our two main segments, four from the first segment and four from the second segment.
Each task that we provide will have a informal description in a general natural language without the use of any kind of formal or professional term or concept. For our purposes of study and analysis we have previously five tasks to be submitted to the eight users. Each task has a specified number of steps that we think that is optimal and we will use this as a benchmark to test users performance. This implies that we are going to provide to the users only the tasks not the steps needed to perform the task. A team member will sit close to the user and without speaking will observe all the route the user follows towards the completeness of the task. The team member will take notes of the actions that the user performs and will evaluate each action based on the benchmark that the team have established. The analysis will be done on existing resources, "concurrent websites". We have choose vocechiara.com, lineargenova.com and amplifon.com as testing websites.

Task no: I

"Find the closed partner clinic to your home and fix an appointment for a hearing test and/or purchase."

* * *

Test Conducted with "lineargenova.com"

1. Open your favorite Browser
2. Write the website name (www.lineargenova.com) in the Browser search bar and click Enter
3. Find "contact us" in the menu bar
4. Click on "contact us"
5. Find your residence city in the list
6. Look for the address of the clinic in the map
7. Look for the work hours of the clinic

O1*: 8. Compose the phone number of the clinic

9. Call the number
10. Fix an appointment with the operator
11. Close the Browser

* * * DONE * * *

O2: 12. Copy the email address

13. Open your email client
14. Write an email
15. Send the email
16. Close the email client
17. Close the Browser

* * * DONE * * *

* This option has to be preferred.

Task no: II

"Make an on-line hearing test and print, save or receive the result by email by providing your personal informations"

* * *

Test conducted with amplifon.com

1. Open your favorite Browser
2. Write the website name (www.amplifon.com) in the Browser's search bar and click Enter
3. Find the hearing test button and click on it
4. Scroll down and find the button for the individual hearing test
5. Start the chosen test
6. Fix the volume of the headphones or speakers
7. Start the test
8. Listen the audio
9. At the end of each audio answer the questions
10. At the end of the section view the results

O1: 11. Print or save the result using Browser's utilities

O2*: 12. Scroll down to the end of the page

13. Find the form that allow you the receive the result via email
14. Fill the form
15. Allow or not the treatment of your personal data
16. Send the informations
17. Close the Browser.

* * * DONE * * *

*This option has to be preferred

Task no: III

"Look for a hearing device with the technical features that your ERT prescribes, you like and can afford and buy it and/or fix an appointment to the shop to buy it".

* * *

Test conducted with vocechiara.com

1. Open your favorite Browser
2. Write the website name (www.vocechiara.com) in the Browser's search bar and click Enter
3. Look at the main menu bar

O1*: 4. Click the button "Product gallery"

5. View the whole range of products
6. Consult the technical information if available
7. Turn back to the main page
8. Find the "Contact us" button on the menu bar and click on it
9. Fill the Form with your informations
10. Send it
11. Close the Browser page

* * * DONE * * *

O2: 12. Click the button "Products and services"

13. Find the product classes
14. Look if the is information that satisfies your needs
15. Click the button "Fix an appointment"
16. Fill Form if any
17. Send the compiled form

* * * DONE * * *

* This option has to be preferred

Task no: IV

"Look for general informations related with the hearing diseases and advices for how to prevent hearing loss".

* * *

Test conducted with amplifon.com

1. Open your favorite Browser
2. Write the name of the website (www.amplifon.com) in the Browser's search bar and click Enter
3. Click on the frame "Know your hearing"
4. Scroll down to view the different arguments or consult the side bar on the left side of the page
5. Find the title that you are looking for
6. Expand the page
7. Read the information that is provided
8. Go back with the go back arrow on the Browser
9. Choose something else if needed
10. Read the newly opened page
11. Finish reading
12. Close the Browser

* * * DONE * * *

Task no: V

"Search for the possibility to customize the hearing devices and see possible models"

* * *

Test conducted with vocechiara.com

1. Open your favorite Browser
2. Write the website name (www.vocechiara.com) in the Browser's search bar and click Enter
3. Click the "Acoustic solutions" button in the main menu
4. Locate and read the information about the customization possibilities
5. Go to the previous page by clicking the go back arrow on the Browser main bar
6. Click the "Product gallery" button on the main menu
7. View the images
8. Click on the icons you like to expand them
9. Use the mouse, touch-pad or direction arrows to navigate the images
10. Close the Browser window

* * * DONE * * *

At the conclusion of the test analysis we provide the results that we have collected in the following table.

Table 2: Silvia 33, Bartender. (Task realized using a mobile phone)

Task 1
➢ Unlock the phone ➢ Press the Internet icon ➢ Click the search bar ➢ Write lineargenova.com ➢ Press "Go" ➢ Have a first look at the page ➢ Scroll down ➢ Scroll up ➢ Press the X icon at the top left of the header ➢ Go to the link "Contatti" ➢ Scroll down ➢ Find Bologna ➢ Click on the google map provided ➢ Enlarge the map ➢ Look the exact address ➢ Take a piece of paper ➢ Write down the phone number ➢ Press the Home button of the phone ➢ Press the "telephone" button of the phone ➢ Dial the number written on the paper ➢ Call ➢ Speak with the clinic ➢ Fix the appointment ➢ Close the phone
■ Test realized at she's working place after work ■ Total number of steps: 24

Table 3: Giovanna 56, Journalist. (Task realized using her PC)

Task 1
➢ Open Chrome (browser) ➢ Scroll down ➢ Scroll up ➢ Going to the left part and reading the menu ➢ Click on "Appointment in Linear" ➢ Reading the page ➢ Go back to homepage with "←" ➢ Scroll down ➢ Scroll up ➢ Go back to the menu on the left ➢ Click on "Contact us" ➢ Reading the page ➢ Searching for Bologna ➢ Click on Bologna (nothing changed, It was not a link) ➢ Scroll down ➢ Click on the map (nothing changed) ➢ Found the link to open the map and click on it ➢ Google map opened ➢ Entered my address ➢ Pressed the button to show the directions (8 min. walk from my office) ➢ Go back to the contact page by clicking on the tab ➢ Writing down the telephone number on a page ➢ Looking at the opening hours (orario) ➢ Unlock the mobile phone ➢ Dial the number ➢ Call the clinic ➢ Speak with the operator ➢ Reserve the appointment ➢ Close the phone ➢ Close the browser
■ Test realized at her office ■ Total number of steps: 30

Table 4: Cristina 23, Student. (Task realized using her Tablet)

Task 2
➢ Press Chrome icon ➢ Click the search bar ➢ Write amplifon.com ➢ Press "Invio" ➢ Have a first look at the page ➢ Search for testing hearing capability ➢ Click on the upper left side menu "Hearing Test" ➢ Scroll down ➢ Insert the headset ➢ Adjust the volume ➢ Click on "I'm ready for the traffic test" ➢ Click on the answer ➢ Click on "I'M ready for stadium test" ➢ Click on the answer ➢ Click on "I'm ready for the concert test" ➢ Click on the answer ➢ Click on "I'm ready for bar test" ➢ Click on the answer ➢ Click on "I'm ready for home test" ➢ Click on the answer ➢ Click on "I'm ready for park test ➢ Click on the answer ➢ Finnish the test ➢ View the result (5,5 / 10) ➢ Scroll down the page ➢ Go to the name box and enter my name ➢ Go to the surname box and enter my surname ➢ Go to the email box and enter my email ➢ Tick on "I consent to the processing of personal data, even sensitive for processing and sending to my email address" ➢ Click on send answer button ➢ Make sure that email was send by viewing the confirmation ➢ Close the browser
■ Test realized at the library ■ Total number of steps: 32

Table 5: Maurizio 54, Restaurant Owner. (Task realized using his Computer)

Task 2
➢ Switch on the Computer ➢ Wait for the boot time ➢ Open Safari ➢ Click on “Know your hearing” ➢ View the new opened window ➢ Scroll down (no hearing test, only information) ➢ Go back ➢ Scroll down the main page ➢ Click on “Discover your auditory profile” ➢ Scroll down ➢ Click on “Ask a specialist” ➢ View the page (not here) ➢ Go back to the previous page ➢ Choose “Hearing test” from the menu bar ➢ Click the volume setting ➢ No audio output (no speakers) ➢ Find a pair of headset ➢ Plugging in the headset ➢ Repeat the volume test ➢ Click the “Begin test” button ➢ Click on “I’m ready for the workplace test” ➢ Click on the answer ➢ Click on “I’m ready for the park test” ➢ Click on the answer ➢ Click on “I’M ready for home test” ➢ Click on the answer ➢ Click on “I’m ready for the bar test” ➢ Click on the answer ➢ Click on “I’m ready for concert test” ➢ Click on the answer ➢ Click on “I’m ready for station test” ➢ Click on the answer ➢ Click on “I’m ready for the station test” ➢ Click on answer ➢ Finnish the test ➢ View the result (5,1 / 10) ➢ Scroll down the page ➢ Go to the name box and enter my name

Table 5: Maurizio 54, Restaurant Owner. (Task realized using his Computer)

➢ Go to the surname box and enter my surname ➢ Go to the email box and enter my email ➢ Click on "Send" (impossible to send, accept privacy conditions ➢ Tick on "I consent to the processing of personal data, even sensitive for processing and sending to my email address" ➢ Click on "Send" button ➢ Make sure that email was send by viewing the confirmation ➢ Close the browser
■ Test realized at his office ■ Total number of steps: 45

Table 6: Ledia 30, Doctor. (Task realized using her Laptop)

Task 3
➢ Open Chrome (browser) ➢ Write vocechiara.com at the search bar ➢ Click "Enter" ➢ Click on "Product Gallery" ➢ Click on a picture ➢ Close it ➢ Scroll down ➢ Scroll up ➢ Click on "Acoustic Solutions" ➢ Click on "Book an Appointment now" (nothing happened, error) ➢ Right click on "Book an Appointment now" and choose "open in a new window" ➢ About blank! Error ➢ Go back to the previous page ➢ Scroll down ➢ Go up to the menu and click on "Contacts" ➢ Enter the name and family name in the provided box ➢ Enter the phone number ➢ Choose a visit at the center Voce Chiara ➢ Enter the email address ➢ Click on "Book" button ➢ Close the browser
■ Test realized at home ■ Total number of steps: 21

Table 7: Angelo 46, Plumber. (Task realized using my Laptop)

Task 3
➢ Looking for the icon of the Chrome browser ➢ Locate the icon ➢ Point and click on it ➢ Blocked (asking for help) ➢ Entering the website name at the search tab of Google ➢ Hit "Enter" ➢ Glancing the Google result ➢ Reading the links ➢ Click on the first link (Not the right one) ➢ Glance at the newly opened page ➢ Go back using the "←" button ➢ Click at the second link (The right one) ➢ Viewing the homepage ➢ Scroll down ➢ Click the big buttons on the center ➢ Scroll up ➢ Click on "Book now" ➢ Viewing the page ➢ Go back using "←" ➢ Click on "Product Gallery" ➢ Viewing the page ➢ Click on the first icon ➢ Close the icon using "X" ➢ Scroll down ➢ Find a nice looking device ➢ Click on it ➢ Click the "X" ➢ Scroll down at the footnote of the page ➢ Look at the phone number there ➢ Write down the number on a piece of paper ➢ Close the browser ➢ Call the number
■ Test realized at my home (his working place) ■ Total number of steps: 32

Table 8: Giovanni 64, Painter. (Task realized using his Computer)

Task 4
➢ Open Internet Explorer (browser) ➢ Write amplifon at the Google's search bar ➢ Click "Enter" ➢ Click on on the first link (The right one) ➢ View the homepage ➢ Scroll down ➢ Click "Amplifon and Cochlear" ➢ Read the information (Not the right one) ➢ Go back to the homepage using "←" ➢ Click on the link "Solutions" ➢ View the newly open page ➢ Scroll down ➢ Look the footnote ➢ Click at the link "Ipoacusica" (Right page for information) ➢ Read the information provided ➢ Scroll down ➢ Click on "Prevent the hearing loss" ➢ View the page ➢ Read the advices provided ➢ Scroll down till the end of the page ➢ Close the browser
■ Test realized at his home (atelier) ■ Total number of steps: 21

Table 9: Noemi 22, Hairdresser. (Task realized using her Tablet)

Task 5
➢ Open the browsers ➢ Type the address (vocechiara.com) ➢ Scroll down ➢ Click on "Product Gallery" ➢ Click on "Contacts" ➢ Search for an email address and write it down to send an email to ask further information about products ➢ Close the browsers
■ Test realized at her home ■ Total number of steps: 7

Table 10: Gabriele 61, Barman. (Task realized using his Laptop)

Task 5
➢ Open the browsers ➢ Type the address (vocechiara.com) ➢ Scroll down ➢ Click on "Digital Acoustic Solutions" ➢ Looking at the image ➢ Scroll up ➢ Click on "Products Gallery" ➢ Looking at the products images ➢ Scroll down ➢ Looking at the address and telephone number provided, they are from Rimini so continue to search to find a branch in Bologna ➢ Scroll up ➢ Click on "Contacts" ➢ Write down the opening hours, telephone number and address (they are only in Rimini) ➢ Close the browser
■ Test realized at his home ■ Total number of steps: 14

Chapter 2

Assessment Of Existing Resources

This chapter presents two very important aspects of the preparatory process before the actual design. We are going to confront existing systems with a number of guidelines that we have choose previously. The goal is to identify a consistent number of errors by the "User Testing" process. The errors we have discovered has to bee listed and to correct based on their urgency and influence. This errors are graphically presented into an "Urgency curve".

Expert Usability Review

The first step in this phase is to identify and adopt a consistent number of guidelines (heuristics) that will be used for the further analysis of the system. We have choose some of the most important and widely employed guideline in the software design industry. These guidelines are taken from three main sources:

- the heuristics of Nielsen and Molich [NM]
- the heuristics of Weinshenk and Barker [WB]
- the heuristics listed in UserFocus (https://www.userfocus.co.uk)

Actually our main goal in the process of choosing the guidelines is to reduce the overall user cognitive load and to concentrate on the visibility and the conciseness of the exposed material. The site must be helpful and easy to use. Here are the numbered guidelines:

NM_01: Visibility of system status - the system should always keep the user informed about its status, by giving him/her feedback in reasonable times.

NM_02: Match between the system and the real world - the system should use the same language used by its users, rather than system terms that could not be clear. It should follow real-world conventions and should show information following a logical order.

NM_03: User control and freedom - the user should use the system as he wants without worrying about doing errors, since the system should always present the ability redo or undo his/her actions.

NM_04: Consistency and standards: the system should always use the same words and situations meaning the same thing, so that the user doesn't have to wonder about what to do.

NM_05: Error prevention - the system should be build therefore error situations could be prevented. If there are situations that cannot be avoided, the system should give the user the option to confirm his/her actions.

NM_06: Recognition rather than recall - the system should minimize the user memory load by making objects and actions visible, or at least making information about them easy to retrieve.

NM_07: Flexibility and efficiency of use - the system should provide shortcuts to accelerate the system usage for expert users, so that they can redo the same actions faster.

NM_08: Aesthetic and minimalist design - content should be the main focus of the site. System information should only contain relevant information, since each information component in a dialogue diminishes its relative visibility.

NM_09: Help user to recognize, diagnose and recover form errors - system error should be presented in plain language without using code, indicating the problem and at least a possible solution.

NM_10: Help and documentation - the system should be built in a way such that no documentation is needed. If this is not possible, documentation should always be easy to retrieve and easy to understand.

WB_01: User control - the system allows the user to perceive that they are in control and will allow appropriate control.

WB_02: Human limitations - the system won't overload the user senses limits.

WB_03: Modal integrity - the system will fit individual tasks whatever mode they're being used, auditory, visual or motor.

WB_04: Accommodation - the system will fit the way each user works and thinks.

WB_05: Linguistic clarity - the system has to communicate as efficiently as possible.

WB_06: Aesthetic integrity - the system will have an attractive and appropriate design.

WB_07: Simplicity - the system will be present elements simply.

WB_08: Predictability - the system will behave in a manner such that users can predict what will happen next.

WB_09: Interpretation - the system will make reasonable guesses about what the user is trying to do.

WB_10: Accuracy - the system will be free from errors.

WB_11: Technical clarity - the system will have the highest possible fidelity.

WB_12: Flexibility - the system will allow the user to adjust the design for custom use.

WB_13: Fulfillment - the system will provide a satisfying user experience.

WB_14: Cultural propriety - the system will match the user social custom and expectations.

WB_15: Suitable tempo - the system will operate at a reasonable time.

WB_16: Consistency - the system will be consistent.

WB_17: User support - the system will provide additional assistance as needed or requested by the user.

WB_18: Precision - the system will allow the users to perform a task exactly.

WB_19: Forgiveness - the system will make actions recoverable.

WB_20: Responsiveness - the system will inform users about the result of their actions and the system's status about them.

The UserFocus is a London based consult and training company in the area of Usability and User Experience. It provides a well-known benchmark for testing the usability and user experience of a system that consists of an "Excel" document containing 247 web guideline. The "Excel" document divided in nine fields, and in each field there are are a number of guidelines related to that specific field. There is an evaluation method that permits to give a (+1) if a system's items comply with the guideline a (0) is the system's item "kind of" comply with the guideline and a (-1) if the system's item do not comply with the guideline. At the end we calculate the final score adding this numbers and of course higher this score is better the chances to have a high usability and user experience.

First Inspection of the System

At first iteration we choose two websites for the assessment: Audifon Snc (www.audiofonsns.com) and Vocechiara (www.vocechiara.com).

Audiofon is an italian company founded in Padova in 1965 and since then has constantly developed the activity dedicated to the people with hearing disabilities.
The services offered: in the case of this kind of companies the services provided by the system reflects the services and products provided by the company. Audiofon offers a range of products and services related with hearing disabilities and hearing loss. We list some of them.

- Hearing devices like phonetic prosthesis and acoustic appliances.
- Possibility of audio test in the clinic or at home.
- Maintenance and repair of the device in case of problems.
- The possibility to look at the price list.
- Personal advisor and personal solutions based on each case.
- Possibility to search the site for information related to hearing problems.
- Preferential treatment and facilitation related with the SSN (Servizio Sanitario Nazionale).
- Possibility to call a green line and have information.

- News related with the activities of the company and the sector in general.
- Other aids and assistance for people that suffer hear loss, like headphone, vibrating alarm clocks etc.
- Possibility to look for office locations and to fill a form with personal information and to be called by the office.

This are some of the main services offered by the system.

The target users: its not obvious to identify a specific user target from the system but based on the fact that the company has a specified business and markets a specific product we assume that the user target are people with possible hearing problems.

Problems immediately identified: One problem that we can identify at first sight as we open the home page is the enormous screen estate taken by this gigantic pictures that obligate you to scroll down or to click on the arrows to see the next one. The first think to do when you see this big pictures is to click over but nothing happens because this pictures are not links. Second is the cookies policy this is a little annoying because you are kind of obligated to click "ok".
Another annoying fact is that the site is only in the italian language and doesn't allow to switch between other languages like "english" for example. A fourth problem that we can see is that at the top right of the homepage there are some contact information that are very small to see and the email address is not a professional company email address but a simple "Hotmail" address that make us think that the system was designed in hurry and without much of thought.

Vocechiara is a Rimini based company that provides solutions for people with hearing problems in various ways ranging from booking a medical examination to selling hearing devices. The site is full of references about the medical team and its leader, which take care of the organization. They have special promotions and services for youngsters.
The services offered: here is a short list of the services offered by the website.

- Book a medical examination near one of the organization structures or book a free medical home visit.
- Read articles regarding hearing diseases and hearing loss.
- Read about the organization team.
- Examine a image gallery of products, devices.
- Device repair service.
- AUSL (Azienda Unita' Sanitaria Locale) and INAIL (Istituto Nazionale per l'Assicurazione contro gli Infortuni sul Lavoro e le malattie professionali) agreements.

The target users: same as the previous case we are dealing with organizations that have as targets people with possible hearing problems. The information available on the website are not enough for people that are just looking for general "information" about the hearing diseases. We can conclude that the main target of this website are people that are looking for a solution, ideally people that live near the location of the company. The fact that they are putting at the front line the team leader is an indication that they base their success to the work of mouth and the references.

Problems immediately identified: At first glance the website is very poor, the homepage is static and old style. The menu bar is very small and hard to see. The company logo is at the top of the page something that to our point of view is not very common, usually the logo is at top left side of the page. The layout of the homepage has to be more attractive and the colors more vivid. Another very important factor is the information available in the page, we consider that the information in this website is very poor and it has to be added. The devices shown in the gallery have to be named and priced and the site has to show more information about the technical specifications of each product. There is not a clear and clean division of the different kind of material provided on the website, for example in the main menu voice "News and Promotions" we find the informations related to the hearing diseases. We think that this should be a separate and highly visible part of the website.

Direct Analysis: System vs. Guidelines

In this stage we are going to evaluate the system with respect to the guidelines. Here, as we did with the first iteration we choose to work with the website vocechiara.com and audiofonsns.com. We described the functions and services provided by this system in the previous section, at this point we are going to have a closer look to each page of the website and confront them with the guidelines that we have choose in the first section.

Vocechiara.com doesn't have a large number of pages so we analyze them one by one. Here is a short list of the pages.

- Home page
- Who we are page (About us page)
- Acoustic solutions page
- Products gallery page
- News and promotions page, which lead to a new page for each article. Every article uses the same format, so...
- Article page
- Contacts page
- Cookies policy page
- Privacy policy page

The problems that we have individuate are listed by page. Before diving into the site problems, we start by saying that the site doesn't differ the user type that can navigate the site (expert or novice), so we'll suppose that the site works only for one type of user.
At the end of the evaluation of each page we show a table representing the respective number of the violated guideline and a description of the problems that we found. Finally at the end we present a summary for the whole website.

1. Home page

Description	Violated guidelines
There are pictures used as buttons, but there is no sign of the fact that these pictures are in fact buttons (e.g changing cursor, button highlighting).	NM_02, NM_06, WB_04, WB_08, WB_16
While the site is in Mobile mode, most of the site content is poorly formatted and placed.	WB_06, WB_10
At the bottom of the page there are pictures used as buttons which leads to other site pages. The same thing is done by the main bar	NM_02, NM_04, WB_16
At the bottom of the page there is the same picture used at the top, which doesn't lead to the same page, one leading to the home page while the other leading to the news page.	NM_02, NM_04, WB_08, WB_16
All the pages are in italian and there is not a possibility to change the language, this make difficult to use by a non italian speaker.	WB_05, WB_12, WB_14, WB_13, WB_16

2. Who we are page

Description	Violated guidelines
Provided description isn't enough to understand the organization qualifications on the argument, unlike its counterparts.	WB_17

3. Acoustic solutions page

Description	Violated guidelines
Provided description isn't full about acoustic solutions, making the content unclear and hard to understand.	NM_03, WB_05, WB_11, WB_16, WB_17

4. Products gallery page

Description	Violated guidelines
Most of the shows pictures are used throughout the site, difference being that now these are used as buttons.	NM_04, NM_06, WB_16
Each shown device has the same description, which isn't helpful since it isn't about the device shown. This could be easily solved by adding a description or a new page for each of them.	NM_10, WB_11, WB_16

5. News and promotions page

Description	Violated guidelines
Reuse of the home page banner, without the book button.	NM_08, WB_06
Some articles aren't completed, showing the "insert text here" text.	WB_10
Some articles are hard to comprehend for people who doesn't know well the argument.	WB_05

6. Articles page

Description	Violated guidelines
Most of the shown links leads to sites with different language, which leads to loss of interest in those users who don't know the language.	NM_02, WB_05, WB_16
Only here you can share using Twitter, despite the fact that on the bottom page you can access the Facebook page on any page.	NM_04, WB_16
Some articles are taken from counterpart sites, quoted at the end of the article. This could lead to a loss of users.	NM_08, WB_16
Some articles use the same color used for links, without being links.	NM_04, WB_16
Some articles use hashtags which doesn't point to a social media page, but instead to the contacts page.	NM_06, WB_16
Each article has a different examination book button.	NM_04, WB_16

7. Contacts page

Description	Violated guidelines
Despite the page name, it contains the examination book form. It should instead be on its own page.	NM_01, NM_03, WB_05, WB_10, WB_16
The book form doesn't check the filled values, so anything could be written in it and it would still be accepted.	NM_04, NM_05, WB_10
If one of the required fields isn't filled, those fields will be outlined by a red color without actually writing which is the problem.	NM_09, WB_17
Once the user has filled up the form and has confirmed, there is no option to remove the book or at least to check its status. The only way to do it is to directly contact the structure near where the user booked.	NM_01, NM_05, WB_01, WB_19, WB_20
Unlike its counterparts, a description about the medical examination is nowhere to be found.	WB_05, WB_11

Despite the fact that there is an email button on the bottom of each page, the shown email on this page doesn't directly opens the email client.	NM_04, NM_06, NM_07, WB_16
There is the option to book a medical home visit, but there is no mandatory address field to fill up.	NM_05, NM_09, WB_10, WB_18

8. Cookie policy page

Description	Violated guidelines
The safari cookie search returns no results (dead link)	WB_10

9. Privacy policy page

Description	Violated guidelines
No major problems found here	None

Overall site

Description	Violated guidelines
The site doesn't offer anything for an expert user, since it doesn't distinct on which user could browse the site.	NM_07
The site doesn't give an optimal feeling while browsing it, since most of the content is formatted poorly or most of its content isn't relevant to the problem which the user could be browsing the site.	NM_08, WB_06, WB_13
The site tends to make the user leave it, either by leading to outer pages or by making the user call the structure (organization) to know more, thus prolonging the actual required time.	WB_01, WB_05, WB_15, WB_17
The site doesn't offer much freedom since most of the actions will lead to the same point, which is booking a medical appointment.	WB_01
The site doesn't try to understand the user needs, but to press the user on booking an examination, thus ignoring the user needs.	WB_01, WB_09
The site doesn't allow customization, mainly because it's not the site main goal to be customizable.	WB_01, WB_04, WB_12, WB_14

At this point we declare finished the direct analysis of the first target system (vocechiara.com) and we start to work with the second site audiofonsns.com. The results for the first site have shown an important number of violations that should be correct in order to achieve a higher score on the usability and user experience criteria.

Audiofonsns.com is a much more sophisticated website and we are going to analyses the main pages.

- Home page
- Who we are page (About us page)
- Hearing solutions page (including six sub-pages of the category)
- Acoustic devices
- Aids
- Audiometric controls
- Assistance and maintenance
- Facilitations
- Price list of acoustic devices
- Health
- Office locations
- News

We are going to follow the same approach as before, we are going to list the individuated problems in tables for every page of the site.

1. Home page

Description	Violated guidelines
There is the cookie policy that take some screen estate and can't be just close, you are obligate to accept or to read more (just 2 buttons).	WB_06, WB_14, WB_16, WB_17, NM_03
At the top right of the page there is a "green number" and an email address that is just a normal "hotmail" address, not so professional.	NM_08, WB_06, WB_13,
There is a big picture at the front of the page that cover the whole page and move after a while and there is no indications that the page is longer and you have to scroll down.	NM_04, NM_05, NM_06, NM_08, NM_09, WB_06, WB_07, WB_08, WB_09,
There is not a search tab at the Home page.	NM_03, NM_07, WB_02, WB_12, WB_13
There is no possibility to change the language, there is only italian.	NM_02, NM_10, WB_01, WB_05, WB_04, WB_13, WB_14
There is no possibility to change the the font size.	NM_03, NM_07, WB_01, WB_13
There is not a visible Contact us button in the main menu.	NM_07, WB_04, WB_13

2. Who we are page

Description	Violated guidelines
Here is a big frame that shows pictures at the top left of the page, there are 3 pictures that circle around.	NM_05, NM_08, WB_06, WB_08
There is no indication that you have to scroll down the page.	WB_08, WB_09
The page is poor and there are not many information about the history of the organization and their specializations.	NM_10, WB_04, WB_13, WB_17

3. Hearing solutions

Description	Violated guidelines
The same big picture on the front of the page.	NM_05, NM_08, WB_06, WB_08
Pictures on the top of the buttons.	NM_08, NM_09, WB_01, WB_06, WB_07, WB_08

3.1. Acoustic devices

Description	Violated guidelines
The same big picture on the front that takes a lot of space.	NM_05, NM_08, WB_06, WB_08
Font size is very small and difficult to read.	NM_03, NM_08, WB_01, WB_02, WB_04, WB_10, WB_12, WB_13

3.2. Aids

Description	Violated guidelines
The same big picture on the front that takes a lot of space.	NM_05, NM_08, WB_06, WB_08
The letters are very small and difficult to read.	NM_03, NM_08, WB_01, WB_02, WB_04, WB_10, WB_12, WB_13
There is a gallery that if you click on a picture it opens and you can navigate the gallery, but there is no concise description of the pictures.	NM_09, WB_04, WB_10, WB_11, WB_13, WB_18

3.3. Audiometric controls

Description	Violated guidelines
The same big picture on the front that takes a lot of space.	NM_05, NM_08, WB_06, WB_08
The letters are very small and difficult to read.	NM_03, NM_08, WB_01, WB_02, WB_04, WB_10, WB_12, WB_13
There is not a clear distinction between links normal text.	NM_01, NM_04, NM_05, NM_08, WB_02, WB_06, WB_08, WB_16
Very few informations and actions in this section.	NM_10, WB_04, WB_11, WB_13

3.4. Assistance and maintenance

Description	Violated guidelines
The big picture on the top of the page take space and make it unaesthetic.	NM_05, NM_08, WB_06, WB_08
Very few informations and actions in this section.	NM_10, WB_04, WB_11, WB_13

3.5. Facilitations

Description	Violated guidelines
The big picture on the top of the page take space and make it unaesthetic.	NM_05, NM_08, WB_06, WB_08
The letters are very small and difficult to read.	NM_03, NM_08, WB_01, WB_02, WB_04, WB_10, WB_12, WB_13
There is not a clear distinction between links normal text.	NM_01, NM_04, NM_05, NM_08, WB_02, WB_06, WB_08, WB_16
There are some acronyms without explanations.	NM_02, NM_04, NM_10, WB_02, WB_05, WB_07, WB_1, WB_13, WB_14

3.6. Price list of acoustic devices

Description	Violated guidelines
The big picture on the top of the page take space and make it unaesthetic.	NM_05, NM_08, WB_06, WB_08
The letters are very small and difficult to read.	NM_03, NM_08, WB_01, WB_02, WB_04, WB_10, WB_12, WB_13
The information in this section seems to be unclear, there are prices but not pictures or technical characteristics of the items.	NM_09, WB_04, WB_05, WB_07, WB_11, WB_13, WB_14

4. Health

Description	Violated guidelines
Same problem as the previous page, the big picture on the top that takes away a lot of space.	NM_05, NM_08, WB_06, WB_08
The sections are divided in an unclear manner.	NM_02, NM_08, WB_06
The is one of the pictures that is a banner picture that is unaesthetic.	WB_06, NM_08
There is not a clear distinction between links normal text.	NM_01, NM_04, NM_05, NM_08, WB_02, WB_06, WB_08, WB_16
At the bottom left of the page there is a dynamic gallery of two pictures that you can't click and expand.	NM_01, NM_02, NM_05, WB_03, WB_04, WB_09, WB_10

5. Office locations

Description	Violated guidelines
The email address is just a hotmail address, not an organization address, this may lead the users to think that the organization is not a serious one.	NM_08, WB_06,
There is only one social networks listed in the top of the page and not other socials like Twitter, Instagram etc.	NM_03, NM_07, WB_03, WB_04, WB_13
The form has not default values.	NM_04, NM_05, NM_06, NM_09, WB_04, WB_09

6. News

Description	Violated guidelines
There are images related to each section that are not clickable and the user may try to click on them without producing the desired effect.	NM_01, NM_05, WB_09
There is no visual evidence that that shows that you have been in a section before, the button color remain the same.	NM_01, NM_02, NM_09, WB_02

At this point we finish the direct analyses of the target site audiofonsns.com.

Reverse Analysis: Guidelines vs. System

At this section we are going to have a look at the guidelines and how the system responds to them. We are going to use here the 247 guidelines provided by userfocus.co.uk. The excel document filled with our evaluation will be provided in the documentation folder.
Regarding the first target site vocechiara.com we had a very poor evaluation. This result means that the website is not very usable and the user experience is very low. The overall website does not provide the necessary services and functionalities for a common user to go through his/her tasks. There are a lot of problems in the way the information is organized and the quantity and quality of that information. The website lack even in the interface and the graphics used are very poor and rudimentary. We present next the scores for each section of the benchmark.

Home page (43%)

The Home page as we know is the first contact of the user with the system. Usually the first impression is the most important one, this means that may be the last or the user will be happy to continue to use the system for his/her tasks. In this case we had many guideline violations. This violations are shown in the following image, but we want to describe some of the mos severe ones.
Firstly, the Home page doesn't have a search input box, something that is really useful and essential in all the modern websites. The users has to loose some time finding the information he needs around the site instead of just searching for it in the search bar.
Secondly, there is not a FAQ section where the user can get instantly information and help if needed. This may make the navigation on the site difficult and obligate the user to leave the site and never come back.
Thirdly, the user can't customize the the most important aspects of the website, like the font size for example. This is a huge problem for people in an advance age that may have eyesight degradation.
Another important problem that we were able to identify had to do with the categories in the main menu, there is a misleading between "Gallery of products and "Acoustic Solutions". In our option one can merge together this two items.
Another problem is the missing of a website map.

Checkpoint	
The items on the home page are clearly focused on users' key tasks ("featuritis" has been avoided)	0
The home page contains a search input box	-1
Product categories are provided and clearly visible on the homepage	-1
Useful content is presented on the home page or within one click of the home page	0
The home page shows good examples of real site content	-1
Links on the home page begin with the most important keyword (e.g. "Sun holidays" not "Holidays in the sun")	1
There is a short list of items recently featured on the homepage, supplemented with a link to archival content	-1
Navigation areas on the home page are not over-formatted and users will not mistake them for adverts	1
The value proposition is clearly stated on the home page (e.g. with a tagline or welcome blurb)	0
The home page contains meaningful graphics, not clip art or pictures of models	0
Navigation choices are ordered in the most logical or task-oriented manner (with the less important corporate information at the bottom)	0
The title of the home page will provide good visibility in search engines like Google	1
All corporate information is grouped in one distinct area (e.g. "About Us")	0
Users will understand the value proposition	0
By just looking at the home page, the first time user will understand where to start	0
The home page shows all the major options	-1
The home page of the site has a memorable URL	1
The home page is professionally designed and will create a positive first impression	-1
The design of the home page will encourage people to explore the site	-1
The home page looks like a home page; pages lower in the site will not be confused with it	0

Fig.13: Home page evaluation

Task Orientation (45%)

The evaluation of this section shows that the site has some serious problems related with the ease and the help that it provide to the user for achieving his/her goals in the sens of the completion of the tasks. The system dose not help the user in his tasks, no prompts or prediction of the users next step. Another important thing is the lack of aids for the novice user or sophistications for the expert user. Here all the users are treated in the same way. As we mentioned precisely there is not customization for example the user cannot modify the ordering of the items showed. The system doesn't provide the possibility of subscription or registration and this may be a problem. There is no price list displayed and this is a big problem because the users are forced to call or to fix an appointment to have this very important information. We are not going to show the image of all the sections because the full benchmark document will be provided in the documentation folder.

Navigation & Information Architecture (59%)

In this section we identified a small number of major problems, related as we highlight previously with the absence of a site map that shows how the content is distributed in the website and the impossibility to sort the information based on the need of the user. There are some other minor issues that has to bee solved in order for the website to achieve a nice usability score. Issues like navigation feedback and user help has to be take care. There is some problems with the quantity and quality of the information provided. This information should be formated better enriched and update more frequently.

Forms & Data Entry (57%)

The forms are one of the most important sources of input for the website. Keeping in mind that we want to minimize the amount of text the user has to write the design and functionality of the forms has to be very precise and efficient. Unfortunately the site that we are considering here doesn't have many forms to deal with and this may be seen as an advantage or as a handicap. The only form that we have studied is the form that permits the user to fix an appointment to the organizations office. Some of the errors that we were able to identify are the following.
The form fields doesn't contain default values to help the user to find his way in the process of the field filling. The default value are a very good practice in the forms that ease to understanding. In the form of the site vocechiara.com there is not an automatic completion of the fields, form example the prefix of the number or the .com or .it of the email address. The site doesn't provide the service of registration and identification of the users, this may seen as well as a handicap but taking in consideration the type of the organization maybe there is no big need to have fix costumers. Usually in the data entry screens the cursor points into the first field of the form that has to be filled, but in the case of vocechiara.com this in not true. The user has to position the mouse in the data field and to click in order to be able to insert data. Another minor problem is that the obligatory fields aren't highlighted clearly and sometimes the user has to double the work by filling more than one time the same field.
This are some of the major problems individuate in the form of vocechiara.com

Trust & Credibility (62%)

This section had the highest score this is due to the fact that the site is centered around the figure of a person that seems to be the team leader or the specialist. This make us think that there is more direct approach between the costumers and the specialist, he is counting a lot to the personal relations with the costumer. The minor problems that we had identified have to do with the material provided. This because the material provided is not enough and the update period seems to be very rare. Another factor that the benchmark has showed is the missing of information about the prices of the services. The assistance is only by telephone or by email, there is not a FAQ or an on-line chat.

Writing & Content Quality (59%)

As the title of the section suggest here we are dealing with the quality of the content. Of course this is a professional website and the terms that are used sometimes are very concise and sophisticated for the medium user but they are written well. The first problem that we see is the quantity of information, there is not enough information. We think that a website that deals with heal problems should have more information and provides much more help to the patients. The information provided is not unique, so it has been borrowed by other sites. A big problem is the lack of information about the product that the site offers, there are not provided the necessary information about the product characteristics and functionalities. There are some link or button labels that are misleading, and this make the costumer to loose time searching around the site.

Page Layout & Visual Design (61%)

Here the evaluation was "good" but if you see the website in his totality you will understand that it is very poorly designed. It looks old and 90' technology. Probably the user that see the home page at first time will leave it immediately. Let us analyses some of the problems that the evaluation highlighted. The buttons are very small and their label doesn't show exactly what they are for. The site is not formatted for printing so if a user wants to print the page he will print it as a web-page not as formatted paper page. Another error is the lack of evidence on the buttons or the links to show that they have clicked or visited previously. Usually in a well designed site when you click a button it changes the color and remain in that color to show that the buttons was clicked before. The site may not satisfying the modern user because of it look and feel. The fonts are readable but the size is not changeable. If a user have a sight problem he/she may have difficulties to read the content.

Search (0%)

Here the target site scores "zero" because there is the total absence of this capability on the website. This is a big problem and we suggest that has to be repair immediately. The modern websites have always an internal search field that allows the user to search for information in the site by entering keywords or phrases. Is a service that facilitates the work of the user that are searching for something particular and not shown clearly at the first page.

Help, Feedback & Error Tolerance (45%)

As we anticipated the site is very weak in the sens that do not cover some fundamental needs of the user such as the need to be helped and to avoid errors in the process of completion of the tasks. Here are some of the main problems that the evaluation highlight. The absence of the FAQ, the difficulties of getting instantaneously help when needed, no missing of feedback for the user etc. There is no help even in the decisions, the user doesn't have any kind of help on choosing the products or the services. Another problem is the absence of error messages in cases that the user do something unusual.

As we had the chance to observe previously, the reverse analysis of vocechiara.com gave us a very poor result (48%). The Img. 14 shows the summary of the scores for each section.

Summary of results

	Raw score	# Questions	# Answers	Score
Home Page	-3	20	20	43%
Task Orientation	-4	44	44	45%
Navigation & IA	5	29	29	59%
Forms & Data Entry	3	23	23	57%
Trust & Credibility	3	13	13	62%
Writing & Content Quality	4	23	23	59%
Page Layout & Visual Design	8	38	38	61%
Search	-20	20	20	0%
Help, Feedback & Error Tolerance	-4	37	37	45%
Overall score		247	247	48%

Fig.14: Evaluation for vocechiara.com website

This score is very low, we can conclude that the website is not usable and the user experience is bad. The second website that we are going to consider is audiofonsnc.com. We applied the same benchmark to the website and the result are the following.

Home page (68%)

The evaluation of the Home page of auidofonsnc.com is much better that the evaluation of the previous website. The main problems that we were able to identify are the following. First of all the Home page doesn't have a search button but the other pages does have it. We think that the search button has to provided in the Home page too in a visible position (for example the top right of the page). A second minor problem is that the Home page does not provide a way to change the font size, it can be done only using the browsers Ctrl +/- and this is not obvious for users that are not expert. Third the site is only in italian. Other minor problems are the overall design of the Home page and the fact that the user has to scroll down the page to find useful information.

Task Orientation (70%)

Major problems we identify here is the absence of the possibility to confront products, meaning that you cannot confront prices or technical specifications of the products. Talking about the price, the site does not contain a real list of prices for the products. There are some general price tags but not a list of whole product and their prices. This is a huge problem we think because the products are of different shapes and sizes and capabilities and the prices ranges from hundreds to thousands of euros. The site is made only for italian users and this excludes the people that may live in Italy but do not speak italian.

Another problem is the missing of the possibility to buy products. We think that this may be on purpose but as you can see if you have a closer look to the page there are products that you do not have to posses a medical receive to buy them, like watches or other kind of voice amplifiers. There is no registration of the users, and this may be an organization policy.

Navigation and Information Architecture (74%)

At this section the site scores well, it has a ordered menu, the information is in place and there is provided a site map. The only problems that we were able to identify had to do with the possibilities of the user to get multiple choices and cross-product evaluations. The pages have to be scrolled down to see important information.

Forms & Data Entry (59%)

Some minor problems identified in this section are the following. The form fields doesn't have default values, this is not a critical problem but is for sure a understanding problem. The forms doesn't show the maximum number of characters to be inserted on the field. The reason that the site scores only 59% is that in the case that the functionalities were there, the implementation had to be better so we evaluated them with a medium value.

Trust & Credibility (77%)

The overall material of the site seems to be up to date and professional. There is a lack of information in some topics, but there are provided some links for further searching. The site provides a number of pictures showing the organizations team and they look professional. A problem of the site is the fact that it's not include a FAQ section or a real time help section.

Writing & Content Quality (89%)

As you can observe the evaluation of this section is good, because we haven't find severe problems regarding the quality of the content. The content may not be unique but is provided in q clear to read and easy to understand way. The language that is used is understandable for the common users and the text areas are not to big. When it comes to the lists, there are few of them and the items on the list are not numbered. The technical terms are avoid and this make the understanding of the information easy.

Page Layout & Visual Design (72%)

We think that the page layout and the visual design should have a better arrangement, meaning that the elements on the page should be located in positions that would make easier for the user to find them and to use them. The colors screen estate should be divided more carefully in order to avoid the need for the user to scroll the page. Another small problem have to do with links and buttons; when you click a button usually it changes color and remain this way for the whole navigation in order to remain the user that he/she have been there before, in the case of this site this is not the case.

Search (53%)

First of all we have to highlight that this website provides an internal search capability. The search field is provided in all the pages with the only exception for the Home page. The search field is a simple, standard implementation with only one option. You can enter simple string of character and the site give you a number of pages that are compatible with the query. There is no possibilities to change the parameters of the queries. There is not a information about the number and importance of the pages that had been found. This are some of the problems related with the searching interior information on the site.

Help, Feedback, Error Tolerance (50%)

The website doesn't make much to help the users to complete their tasks. There is not a FAQ section or a real time help possibility.

At the end the final result of the evaluation for audiofonsnc.com was 68% that is better than the first system that we evaluated. The image 15 shows the summary of this values.

Summary of results

	Raw score	# Questions	# Answers	Score
Home Page	7	20	20	68%
Task Orientation	18	44	44	70%
Navigation & IA	14	29	29	74%
Forms & Data Entry	4	23	23	59%
Trust & Credibility	7	13	13	77%
Writing & Content Quality	18	23	23	89%
Page Layout & Visual Design	17	38	38	72%
Search	1	20	20	53%
Help, Feedback & Error Tolerance	0	37	37	50%
Overall score		247	247	68%

Fig.15: Evaluation for audiofonsnc.com website

Error Discovery and Classification

In this section we are going to deal with the errors that we have discovered during the previous phases of analysis. In the following phases we will concentrate our attention to only one website; audiofonsnc.com because is the system that had the higher value in the evaluation phase. We think that this system express much better the needs and the tasks that a common user should have in such a system. We will consider the errors found in the revers analysis because we think that this category include the others two (guidelines of NM an WB). The errors that may be discovered in next section will be exposed in the end of the correspondent section. In the classification of the errors we will use the Nielsen methodology. In this methodology the errors are divided in the five following categories.

- *Implementation errors*: when the completion of the task needs the use of a feature that the user know about this but can't find it in the system or it's not implemented on the system.
- *Catastrophic failure*: the user cannot carry out his task.
- *Major error*: the user complete the task after significant amount of time and relevant questions, doubts and wrong choices.
- *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.
- *Cosmetic error*: the user completes the task in a reasonable time but you can see a possibility of improvement.

In order to understand better the nature and the severity/gravity of the errors we will quantify this by adding a number between 1 and 5, with 1 to be the lowest level of severity and 5 to be the highest one. In the case of 5, this mean that the problem is critical and has to be fixed as soon as possible. The following table shows the errors discovered and their characteristics. Every error has an unique identifier, a description, classification, section where it was discovered and a severity value that is a numeric value based on persistence, impact and frequency of the error. As we underlined previously this value is handy in the phase of the graphical representation of the errors (Urgency Curve).

Table 11: Error Classification

Error Id	Error Description	Classification	Section	Gravity
E0	The Home page does not contain a search input box.	Implementation	Home Page	5
E1	There is no comparison option among the products for the user.	Implementation	All	5
E2	The price list of the products is not available.	Catastrophic	Product List	5
E3	No format for emails or phone numbers.	Cosmetic	The Offices	1
E4	There is no possibility for on-line shopping.	Catastrophic	All	4

Error Id	Error Description	Classification	Section	Gravity
E5	There is no possibility of filtering information pages.	Minor	All	3
E6	There is no option for the user to sign up.	Implementation	All	3
E7	Product page does not contain links to similar and complementary products to support cross-selling.	Implementation	Product List	3
E8	There is no filtering system for listing the products.	Implementation	Product List	3
E9	Users should use scroll bar to view the complete page.	Cosmetic	All	2
E10	The obligatory fields does not warn the user for external information needed.	Minor	The Offices	2
E11	With data entry screens, the cursor is not placed where the input is needed.	Cosmetic	The Offices	1
E12	Forms are not validated before the form is submitted.	Minor	The Offices	2
E13	There is no on-line chatting or FAQ for receiving assistance.	Implementation	All	3
E14	There is no obvious part to ask for appointment to consult a specialist. It is just a contact form.	Implementation	The Offices	3
E15	The website is not print friendly.	Minor	All	2
E16	There is not a good balance between information density and use of white space.	Cosmetic	Home Page	1
E17	The search engine does not handle empty queries.	Cosmetic	All	1
E18	There is no powerful search interface to available to help users refine their search.	Minor	All	2
E19	There is no suggestion for search box, like Google's "did you mean..."	Minor	All	2
E20	The site does not use a customized 404 page, which includes tips on how to find the missing page and links to "Home" and "Search".	Minor	All	1
E21	Error messages do not contain clear instructions on what to do next.	Major	All	3
E22	The site does not provide immediate feedback on user input or actions.	Major	All	3
E23	There is no tooltip text for the products.	Minor	Product List	2

Error Id	Error Description	Classification	Section	Gravity
E24	There is no help section considered for the user who are unfamiliar with the website.	Major	All	3
E25	There has been considered no arrangements for users possible error prevention.	Implementation	The Offices	4

As you can see on the table we identified 26 errors with different characteristics and in different sections of the target website. A summarized table based on the error classification is provided.

Table 12: Summary of Error Classification

Classification	Number of Errors
Implementation Errors	8
Catastrophic Failures	2
Major Errors	3
Minor Errors	8
Cosmetic Errors	5

User Testing

User testing is a very important phase in the development process of a system. It is generally accepted that the feedback provided by real users is more valuable than all possible theories. For this project we are considering Discount Usability testing (Guerrilla testing) as a fast and low-cost method to get real user's feedback. We think that this kind of testing should help us in this first stages of designing, to realize possible implementation errors and the level of satisfaction that the system is offering. The methodology selected is the "Think Aloud", practically in this methodology the assistant (in our case Fabio) ask the participant subjects to perform the tasks and to talk to him what are they doing and what are they thinking. The assistant has to push the subject to act and speak at the same time, but should never tell to the subject what to do and how to do it, exceptions are make in the case that the subject is stacked and cannot complete the task.
The budget that we have planned for the test is 50€ and small aperitif with the participants. We have arranged the meeting room of the company for 3 hours starting at 5 a clock PM till 8 a clock PM.
The process of selecting the participant was actually easy, the main considerations was that the subjects had to be into the two main segments that we have studied in the previous phase. At the end of the selection phase we choose 3 participant, one in the first segment, age 19 to 44 and 2 from the second segment, age 45 to 64. A brief description of the subjects will be provided in the protocol table. For the evaluation process we considered the standard triple E metrics. At the first stage we will describe results based on the Effectiveness and Efficiency criteria. Second we will evaluate the Satisfaction of the subjects at the end of the test. We will use the System Usability Scale (SUS) to get concrete values of approval of the system.
SUS is a well known method to evaluate users emotions when using the system. It consists of 10 general questions, both positive and negative and each of them has an evaluation range (Likert scale) from 1 to 5. The final score of this test is parametrized in percentage and a score equal of bigger than 68% is acceptable and indicate a good satisfaction. SUS is calculated based on an algorithm that we are not going to describe here but we will use to evaluate the system. Of course there are many other ways to evaluate satisfaction like Likert scale, ASQ (After-Scenario Questionnaire), SEQ (Single Easy Question) etc but we think that SUS is the better way to provide the kind of data that we need.
Regarding the first "E" of EEE - Effectiveness, here we are going to evaluate the accuracy and the completeness with which the users execute the tasks.
The second "E" of EEE - Efficiency, is dealing with the amount of effort the users has to put in, in order to complete the task.
Both the Effectiveness and Efficiency are quantitative measures and we are going to considered them based on 5 elements: Success, Time, Errors, Efficiency and Learnability.
We are going to execute the testing on the audiofonsnc.com website.
The following table summarize the testing protocol.

Table 13: Testing Protocol

Testing type	Discount Usability Testing
Testing methodology	Think aloud
Test manager	Fabio S.
Number of tests	3
Date	4 April 2018
Number of subjects	3
Location	Companies meeting room
Budget	50€
List of tasks to be tested	Task 1: The user has to search for information related to the hearing loss on the site. Task 2: The user has to book an appointment to the office near his/her home. Task 3: The user has to look at the product gallery, view and compare the prices and characteristics of the items.
Subjects and justification	Mariagrazia, 25, student (she represent our first segment, has a high level education, advanced knowledge of Internet with an average 15 hours of use per week. She is mostly interested in social networks, on-line videos and news. Maria, 61, homemaker (Mrs. Maria represent our second segment, she is a homemaker with very little knowledge of Internet. She is able to use only messaging applications like Whatsapp. Carmelo, 58, freelancer (Mr. Carmelo represent our second segment, he is has a basic knowledge of Internet and use it to search for news and videos.
Description of the expected results	We are going to use the EEE metrics to evaluate the test. First we are going to consider the Effectiveness and the Efficiency and second the Satisfaction. In the case of Satisfaction we are going to use the System Usability Scale (SUS).
Test organization	Is divided in 3 parts: 1. Preparation of the participants 2. Execution of the test 3. Evaluation of the results

As shown by the table the test organization is divided in 3 sequential steps.

Step 1: Preparation of the participants - we have fixed three appointments with all three participants in three different times. The first participant (Maria), starts at 5 a clock PM, the second (Carmelo) at 6 a clock and the last one (Mariagrazia) starts at 7 a clock. We planned that test will take at maximum 30 minutes for each subject.
First of all when a participant enter to the room for the testing we make he/she feel comfortable by showing him the room and the position where he/she is going to sit in order to perform the test. There is a table with 2 seats and a laptop PC. The PC is turned on and there is preloaded a neutral website like Google.com on the browser.
We assure the participant that here we are testing the system and not them ability to operate it, so we ask them to be honest and to not be timid to talk as they acting on the system. They are encouraged to find as much errors and problems as they can, even the smallest things that they do not like at the website. Another thing is that they are free to ask any question they like but the assistant may not ask all of them for obvious reasons, we want the test to be as realistic as possible.
The participants enter one at a time on the meeting room. As they start to execute the tasks the assistant should take notes about the behavior and the actions the subject is performing. We record the participant voice in order to studied later and to have a more clear idea about the testings in the evaluation process. We explain them that the recording voice will be used only for the purposes of the project design.

Step 2: Execution of the tasks - at this point we are actually executing the tasks. We are to describe a summarized version of each test performed and how the participant behaved. This is not the evaluation phase but just an high level description of each test.

Test number 1: Mrs. Maria (Total time employed =15 minutes and 2 seconds)

Task number 1: (Time employed = 5 minutes and 34 seconds)
"The user has to search for information related to the hearing loss on the site".

Considerations:

- The task took relatively low time to perform; the assistant helped the subject in some case to resolve technical problems related with her level of Internet knowledge.
- The subject saw the main bar entries and clicked on the news, where she found what was needed.
- The subject have not identify any problem in this phase.

Task number 2: (Time employed = 1 minute and 36 seconds)
"The user has to book an appointment to the office near his/her home".

Considerations:
- The task was completed successfully but was more difficult to perform.

- This is due to the fact that there is no book entry on the main bar.
- The subject was able to complete the task by moving around the site until she found what was requested.
- The subject advised to add a book button into the main bar.

Task number 3: (Time employed = 7 minutes and 48 seconds)
"The user has to look at the product gallery, view and compare the prices and characteristics of the items".

Considerations:

- The task was more difficult to perform, around 8 minutes.
- The subject kept on asking the assistant about the position of the "Gallery", since no "Gallery" entry was found on the main bar.
- The subject advised to put a "Gallery" entry so that other users could do this task easily.
- The subject also advised to move the devices price page to the Gallery page page, or to merge them into one page, so that she could see the devices price looking at the pictures.

Test number 2: Mr. Carmelo (Total time employed = 8 minutes and 4 seconds)

Task number 1: (Time employed = 2 minutes and 17 seconds)
"The user has to search for information related to the hearing loss on the site".

Considerations:

- The effective task took about 2 minutes.
- First, the subject looked into the "Acoustic solutions" page and then into the "Who we are" page without success, then moved to the "News" page where he found what he needed.
- No main problem found here.

Task number 2: (Time employed = 40 seconds)
"The user has to book an appointment to the office near his/her home".

Considerations:

- Task was solved almost immediately since during first exploration the subject saw the form.

Task number 3: (Time employed = 2 minutes and 32 seconds)
"The user has to look at the product gallery, view and compare the prices and characteristics of the items".

Considerations:

- The task took some time because the "Gallery" entry was not found in the main bar.

- The subject advised the same things as the Test number 1 and added that the price comparison embedded into the site could be useful (or at least a form), so that the user manage independently the device choices.

Test number 3: Miss. Mariagrazia (Total time employed = 10 minutes and 40 seconds).

Task number 1: (Time employed = 5 minutes and 1 second)
"The user has to search for information related to the hearing loss on the site".

Consideration:

- The task was aborted since the subject couldn't find enough information regarding the hearing loss.
- The subject highlighted that the only way to get enough information is to call the office and to talk directly to somebody.

Task number 2: (Time employed = 0 minutes and 41 seconds)
"The user has to book an appointment to the office near his/her home".

Considerations:

- The task was executed almost immediately since since clicked on "Audiometric exam" and saw the "Book now" button.
- The subject noted that the book page should be in a separate page, since it is located on the domicile page.

Task number 3: (Time employed = 2 minutes and 6 seconds)
"The user has to look at the product gallery, view and compare the prices and characteristics of the items".

Considerations:

- The task was solved in a couple of minutes. First, the subject clicked on the "Price comparison" page, then on the "Aids" page.
- The subject noted that this task was completed quickly since she was asked to explore the site and saw the gallery on the "Aids" page.

Step 3a: Quantitative Evaluation - at this point we have all the data we need and we are going to apply the "EEE" evaluation on them. In our evaluation process we are going to consider the following five metrics: Success, Time, Errors, Efficiency and Learnability. We are going to use "Yes" or "No" as values for the Success, the effective time needed for the task, a few words of description for the errors and the scale {"Small", "Medium", "High"} for the Efficiency and the Learnability. The following tables represent the evaluation of each task for each test.

Evaluation table for the first test. The subject in this test is Mrs. Maria.

Table 14: Evaluation of Test 1 (Mrs. Maria)

	Success	Time	Errors	Efficiency	Learnability
Task 1	Yes	5' 34''	The subject had some issues with the use of the Internet because of her unfamiliarity with the application but no issues concerning the site was found.	Medium	Medium
Task 2	Yes	1' 36''	He subject was able to complete the task but she spent time searching around the site to find the page for the booking.	Small	Small
Task 3	Yes	7' 48''	Some errors with the orientation on the site, because there is unclear where the product are and how to compare them.	Small	Small

Evaluation table for the second test. The subject in this test is Mr. Carmelo.

Table 15: Evaluation of Test 2 (Mr. Carmelo)

	Success	Time	Errors	Efficiency	Learnability
Task 1	Yes	2' 17''	The subject has problems to individuate the place where the information is kept. With the help of the assistant the subject was able to find the right page. A problem here is that the categories are not well divided.	Small	Small
Task 2	Yes	0' 40''	Nothing important to highlight, the subject individuated immediately the way how to execute the task.	High	Medium
Task 3	Yes	7' 48''	Here the subject found an implementation problem because the site doesn't provide the possibility to confront the prices and characteristics of the products. The subject figured out how to find the missing pieces by searching around the page, first he saw the gallery of product that is a section under another more general page and the he saw the prices. The problem here is that the user has to do waste time and the cognitive load is increased because of the different informations that the user has to keep in mind while confronting the products.	Small	Medium

Evaluation table for the third test. The subject in this test is Miss. Mariagrazia.

Table 16: Evaluation of Test 3 (Miss. Mariagrazia)

	Success	Time	Errors	Efficiency	Learnability
Task 1	No	5' 01''	The subject aborted the task because she couldn't find the information she was looking for and the site is poor of relevant information. There were a series of minor errors because the subject was searching around for informations without knowing exactly where to click.	Small	High
Task 2	Yes	0' 41''	No problems here, the subject found immediately the page and fixed out how to fix an appointment. She saw immediately the button in the main menu and clicked it, at the new page the subject realized almost at first sight that she had to call the number showed or to fill the forms to fix the appointment.	High	High
Task 3	Yes	2' 06''	The subject was disorientated because she doesn't know how to solve the task. After some time she found the page for the prices but there was to problem to find the gallery of the products, because the two pages are separated and not intuitive how to find them. The subject made a lot of small errors clicking around and searching around the site for the page that had the gallery of the products. Finally when she found that she had to to a mental comparison between the products because the site doesn't provide such a possibility. This is a very big problem of this site.	Small	Medium

Step 3b: Qualitative Evaluation - in this section we are going to evaluate the emotions of the users when using the system. To make this happened we decided to use the SUS method. As we mention previously SUS is the most suitable method in our case, it consists of 10 positive and negative questions and the user has to give a numeric value to each question ranging from 1 to 5. In the following pages we will provide the SUS module of each subject and its score. We will provide the original documentation on the projects folder.

SUS module for Mrs. Maria.

1. I think that I would like to use this website frequently.

1	2	3	4	5

2. I found this website unnecessarily complex.

1	2	3	4	5

3. I thought this website was easy to use.

1	2	3	4	5

4. I think that I would need assistance to be able to use this website.

1	2	3	4	5

5. I found the various functions in this website were well integrated.

1	2	3	4	5

6. I thought there was too much inconsistency in this website.

1	2	3	4	5

7. I would imagine that most people would learn to use this website very quickly.

1	2	3	4	5

8. I found this website very cumbersome/awkward to use.

1	2	3	4	5

9. I felt very confident using this website.

1	2	3	4	5

10. I needed to learn a lot of things before I could get going with this website.

1	2	3	4	5

SUS Evaluation:	45

SUS module for Mr. Carmelo

1. I think that I would like to use this website frequently.

1	2	3	4	5

2. I found this website unnecessarily complex.

1	2	3	4	5

3. I thought this website was easy to use.

1	2	3	4	5

4. I think that I would need assistance to be able to use this website.

1	2	3	4	5

5. I found the various functions in this website were well integrated.

1	2	3	4	5

6. I thought there was too much inconsistency in this website.

1	2	3	4	5

7. I would imagine that most people would learn to use this website very quickly.

1	2	3	4	5

8. I found this website very cumbersome/awkward to use.

1	2	3	4	5

9. I felt very confident using this website.

1	2	3	4	5

10. I needed to learn a lot of things before I could get going with this website.

1	2	3	4	5

SUS Evaluation:	12.5

SUS module for Miss. Mariagrazia.

1. I think that I would like to use this website frequently.

1	2	3	4	5

2. I found this website unnecessarily complex.

1	2	3	4	5

3. I thought this website was easy to use.

1	2	3	4	5

4. I think that I would need assistance to be able to use this website.

1	2	3	4	5

5. I found the various functions in this website were well integrated.

1	2	3	4	5

6. I thought there was too much inconsistency in this website.

1	2	3	4	5

7. I would imagine that most people would learn to use this website very quickly.

1	2	3	4	5

8. I found this website very cumbersome/awkward to use.

1	2	3	4	5

9. I felt very confident using this website.

1	2	3	4	5

10. I needed to learn a lot of things before I could get going with this website.

1	2	3	4	5

SUS Evaluation:	10

Here we show a table that summarize the SUS score provided by the three subjects.

Table 17. SUS score

Maria	12.5
Carmelo	40
Mariagrazia	10

The chart below represents the average SUS score of our site compared to the average score of 500 real world companies.

At this point it is easy to observe that the average SUS score of our test site is very low, exactly 22.50.
We conclude that the satisfaction criteria is not met because the user level of emotions when using the site is very low. We attribute this low level of satisfaction in the problems the site has with the organization of the content and in some cases in the absence of information. In the following pages we are going to summarize some of the comments that the users had about the site and later on we are going to produce the "Urgency Curve" that describes the error found and how urgent is to repair them.

Analysis of the subjective and objective objective data

At this point we have accumulate a large amount of data from the User Testing that we are going to list, first in an informal way like comments or natural language and later on as a formal representation of the data using the Urgency Curve.

Subjective analysis (user comments)

"The site do not provide enough information about the hearing loss and about the products that it sells".

"Most of the user had a hard time finding the right pages to to complete their tasks because the page grouping was wrong or complicated".

"The page names are misleading".

"The users have difficulties to find information because the Home Page does not provide a search field".

"The site is more complex that should be user complained".

"Most of the users doesn't like the overall graphic design of the site".

"User have complained that they are obligated to remember a lot of things form one page to the other".

"User complained because the site does not provide a product comparison possibility".

"The users haven't be able to find the price for each product because they are not listed"

"There is no filtering possibilities in order to choose products base on the user necessities".

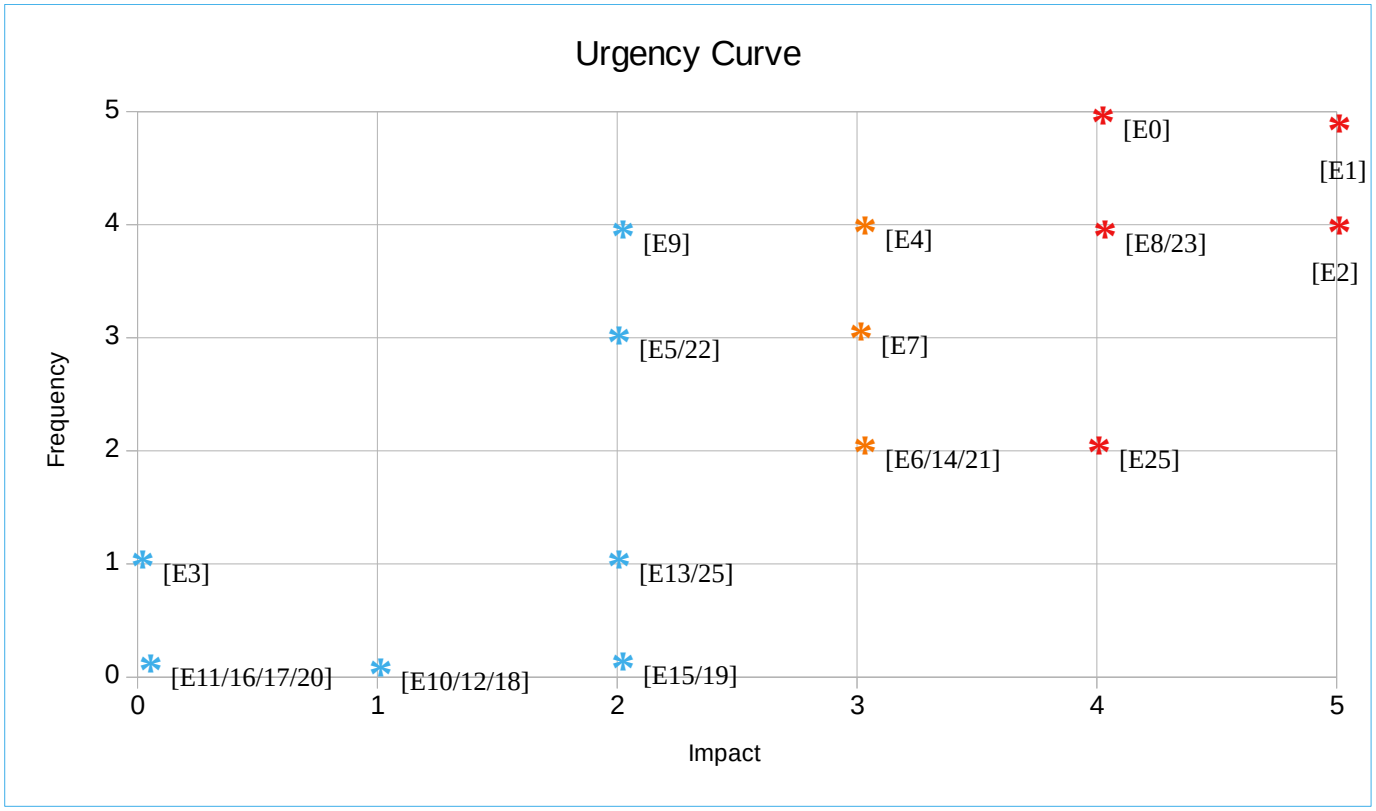
Objective Analysis (error representation):

We refer to Table 11 (Error Classification) at this point, because the errors the user testing identified were exactly some of the error we identified on the phase of direct and reverse analysis. In this case the user testing confirms out evaluation and doesn't add something new to the error list. The following table is a new table based on the Table 11 that shows the errors we have found and assign them an numeric value form 0 to 5 for each error and for each of the two main characteristics that we are interested on: the "Impact" and the "Frequency".
In our case the Urgency Curve is a two-dimensional chart that has in the X-axes the "Impact" and in the Y-axes the "Frequency".

Table 18: Error summarization

Error Id	Error Description	Impact	Frequency
E0	The Home page does not contain a search input box.	4	5
E1	There is no comparison option among the products for the user.	5	5
E2	The price list of the products is not available.	5	4
E3	No format for emails or phone numbers.	0	1
E4	There is no possibility for on-line shopping.	3	4
E5	There is no possibility of filtering information pages.	2	3
E6	There is no option for the user to sign up.	3	2
E7	Product page does not contain links to similar and complementary products to support cross-selling.	3	3
E8	There is no filtering system for listing the products.	4	4
E9	Users should use scroll bar to view the complete page.	2	4
E10	The obligatory fields does not warn the user for external information needed.	1	0
E11	With data entry screens, the cursor is not placed where the input is needed.	0	0
E12	Forms are not validated before the form is submitted.	1	0
E13	There is no on-line chatting or FAQ for receiving assistance.	2	1
E14	There is no obvious part to ask for appointment to consult a specialist. It is just a contact form.	3	2
E15	The website is not print friendly.	2	0
E16	There is not a good balance between information density and use of white space.	0	0
E17	The search engine does not handle empty queries.	0	0
E18	There is no powerful search interface to available to help users refine their search.	1	0
E19	There is no suggestion for search box, like Google's "did you mean..."	2	0
E20	The site does not use a customized 404 page, which includes tips on how to find the missing page and links to "Home" and "Search".	0	0
E21	Error messages do not contain clear instructions on what to do next.	3	2
E22	The site does not provide immediate feedback on user input or actions.	2	3
E23	There is no tooltip text for the products.	4	4
E24	There is no help section considered for the user who are unfamiliar with the website.	4	2
E25	There has been considered no arrangements for users possible error prevention.	2	1

At this point we design the Urgency Curve.



* Fix in a future release * Fix in the next iteration of the design process * Fix now

As you can see to the errors are given a color scheme based on the urgency that they have to bee treated. The red asterisks are problems that have to bee solve as fast as possible.
In the next chapter we are going to focus on the Feasibility and the study of different aspects of stage such as Scenarios and Personas.

Chapter 3

Feasibility Study

In this chapter we are going to actually start the first phase of study and design of the new system. This phase is called "Feasibility study" and takes in consideration the overall factors that influence the system and its users in order to obtain a better view of the users in relation with the system itself.
Feasibility study is the first phase of User-centered design approach and is divided in 3 main parts: Stakeholders meeting, Context of use analysis and Scenarios. In the following pages we are going to dig further into this concepts and provide our conclusions and designs for the new system we are going to construct.

Context of Use

In the first chapter we have identify the main users of the system in the phase of segmentation. We will consider two groups of people based on their age.
The first group (segment) consist of individuals between 19 years old and 44 years old. Statistical this category is not at high risk of hearing loss, so we consider them as potential secondary users that may use the system to search for general information or to help their relatives that may have technical problems of using the system. In this sens we refer to the older people that may not be able to use the Internet or younger people (teenagers) that may not be able to take initiatives on their own.
The second group (segment) is our main user group. This segment consist of individuals in the age range form 45 years old to 64 years old. We will focus our design choices in this category because is the most favorable on having hearing loss problems and in the same time to have a nice level of familiar with the modern technology including here the use of Computers and Internet.

Context of Use: Tasks

As we have highlighted previously the main tasks of the users related to the use of the system are basically of two types. First, purchasing a product or fixing an appointment to the office for further analysis and consultancy and second, looking for information and suggestions regarding the problems and the diseases related to the hearing. Of course this is a very restricted view of the tasks the users can execute on the system, a broader list of tasks is shown below.

- Searching for general information related to hearing loss.
- Searching for hearing device and other solutions.
- Fixing an appointment for further examinations and possible purchase.
- Viewing the product gallery and the price list.
- Comparing the products.
- Calling the office for direct information.
- Having an on-line hearing test.

This are some of the main tasks that the user may want to execute using the system.

Context of Use: Technical constrains

Basically the only technical constraints a user may have are related with his/her ability to use the web and the devices with which the web can be accessed. We assume that the users we have targeted have some familiarity with this technologies. This assumption is based on statistics taken by the italian institute of statistics (istat.it) and the annual survey of Deloitte (deloitte.com) on the Global Mobile Consumer Survey 2017. The second source is very useful because it is a very good study of the overall aspects related with the use of mobile devices by italians in 2017. The survey shows that more than 94% of italians use a smartphone an in other charts is showing the specific functionalities that are used. We will provide this document in the project folder. Summarizing we assume that our users have a Internet connected device such Computers, Tablets or Smartphones.

Context of Use: Cultural and Environmental constrains

The system (site) is targeted to the italian users so we suppose that the language will not be a concern in Italy, but in order to offer a richer and more inclusive user experience we will provide the possibility for the user to select a language. Our second choice of the language is the english language. The user may select the language he like to use during the navigation. The default language will be the italian language. Another important cultural factor that may be difficult to understand is the technical language and the acronyms used. We will explain in simple words this terms the first time that the user get in contact with them.
The last element is the environment where the interaction is taking place. In our case the environment is not a limiting factor because one can navigate the site in different environments, like in his home, in the office in an open place provided an Internet connection and a device.
Normally this kind of interaction will take place in a comfortable and well-known environment like the home or the office of the user. We can assume that the overall conditions of the environment are good will the right quantity of light and the presence of the Internet connection.

Scenarios

Until now we have consider tasks, now we are going to consider “scenarios”. We describe the scenarios as the steps that a user execute in order to fulfill his/her goals. The scenarios have the form of short stories and are composed of one or more tasks.

Scenario A: “...searching for on-line information about the hearing loss”.

Anna is siting in the sofa at her parents house and watching the television. There is an advertisement about a company that provides solutions and information to people with hearing loss. Suddenly Anna realized that she may have a possible hearing problem and google the link in her smartphone.
She saw the button on the main menu about how to know and to prevent hearing loss.
Anna read the information provided and was happy to realize that she has no symptoms of hearing loss, but to better convince herself she decided to do an on-line hearing test.
Anna found the section on the site relative to the hearing test and perform the test. At the end of the test she obtained the result and was happy to see that there was no problems with her hearing.
She closed to website and continued to watch cheerfully the television.

Scenario B: “...looking for a solution to my hearing problem”.

Giovanni is a 58 years old musician and with the passing of the time he experienced a gradual loss of his hearing abilities. Some years ago this was not a relevant issue for him but now he thinks that this is a very sever problem and he feel embarrassed when he speaks with his colleagues and even with family members.
After a visit to the ENT doctor he decided to look for a hearing device suitable for him.
He googles “hearing solutions” in his laptop and found an organization (ourSite.com) near his home that he though has the right solution to his problem.
Giovanni filled the forms in the “contact us” section for an appointment and in few minutes received a confirmation e-mail with the date the address and the exact time of the appointment.
Satisfied about the correctness and the speed of the response, Giovanni closed the laptop and went at out for a walk.

Scenario C: “...i need to fix my hearing device”

Adriano has a long term hearing disability. A year ago he changed his hearing aid and from then he never had a problem, but the last week he experienced a problem on the sound quality.
Adriano thinks that this is a device problem so he went to the website of the company and and searched to the search field about similar problems. After a while he found something related and he changed some settings in his device but surprisingly he couldn’t fix the problem.

He thought that the best solution was to call the company and to ask them how to solve the problem.
After some minutes of talking Adriano understand that he couldn't fix it by himself so he fixed an appointment to the repair center.
Two days later he had an almost new hearing device.

Scenario D: "...ENT doctors have to be updated about the new devices".

Alessia is ENT doctor and in she's everyday professional life she deals with patients with different hearing problems and disabilities.
Usually she's job concern with the different kinds of exams and hearing tests but in some cases she has to prescribe to the patients a hearing device.
In order to be updated with the new devices and technologies she frequently search to the web for information.
She is interested in particular to the shapes and the technical characteristics of the devices, so the first thing she do when she open the site is to look at the gallery of the products where the images and the technical description is provided.
Alessia search for information in different sites and in case a patient ask her for a reference about companies that provide hearing solutions she list them a few of them.

Scenario E: "...i want to help my grandmother".

Andrea thinks that his grandmother has some sort of hearing loss and he want to help hear overcome this problems and increase she's life quality.
He knows that she cannot search for on-line solutions because she don't know how to use the computer and she is embarrassed about this problem and don't want to talk about this.
Andrea search on the site about the real life symptoms of people with hearing problems and confront them with the symptoms of his grandmother.
He found that there is a perfect match and with very high probability his grandmother have an evident hearing loss.
Some days later and with the results of the hearing test on his hand Andrea search for solutions to the website. He knows that he can get a discount from the (National Sanitary System) so before fixing an appointment Andrea search for this information on the site.
He found that the company helps the costumers in the paper work for getting this kind of discounts form the NSS.
Andrea call the company and fix an appointment for his grandmother.

Personas

Alberto ROSSI, 56 dentist

Alberto ROSSI

"I want to grow my company and to be more efficient in my work ."

Age: 56
Work: Dentist
Family: Married, 2 children.
Location: Bologna, Italy
Income: High (200 K+)
Character: Enthusiast

Personality

Introvert	Extrovert
Thinking	Feeling
Sensing	Intuition
Judging	Perceiving

Goals

- Grow my clinic and make new customers.
- Dedicate more time to my family.
- Travel more often and make new connections.

Frustrations

- I hate to ask my interlocutors to repeat .
- When i'm not in charge of my businesses.
- Inefficiency.

Bio

Alberto born in Bologna at 4th of February 1962. He was a very good student during all his scholastic carrier. He attended the course of Dentistry at the University of Bologna. During his student time he met Sofia, a young Law student form Rome. It was love at first sight and 3 years later they married and decided to live in the city of Bologna. Two years after their marriage they had the first children, Lorenzo and four years later their daughter Cristina. Meanwhile Alberto was working as a dentist in a clinic. At age 42 Alberto opened his own clinic and from then until now he manage the clinic an his team of 8 peoples.

Motivation

Incentive
Fear
Growth
Power
Social

Brands & Influencers

LACOSTE

Preferred Channels

Traditional Ads
Online & Social Media
Mobile Apps

Alberto is a dentist who lives and works in the city of Bologna. He is the owner of the clinic and leads a team of 8 people. Alberto is married with Sofia and have 2 children.
Alberto is a very enthusiastic person, he is well aware of his capacities and he like to grow his business and open other centers. He is a very social man and like to make important connections with interesting people.
He passes the weekends with his family and one of he's goals is to dedicate more time to the family.
As all the busy people he don't like to waste time because he think that time is a very precious resource. He want to be in charge of his team and have to respect from the people around him. He like to be informed and do a very good use of the Internet and the mobile applications.
Alberto deals with a hearing loss, something that make him fill embarrassment so he want a permanent and qualitative solution.

Fabio FERRARA, 45 bartender

Fabio FERRARA

"I made my passion, my profession ."

Age: 41
Work: Bartender
Family: Married, 3 children.
Location: Bologna, Italy
Income: Medium (20 K+)
Character: Obliging

Personality

Introvert — Extrovert
Thinking — Feeling
Sensing — Intuition
Judging — Perceiving

Goals

- Open my own bar-restaurant.
- Be independent at my job.
- Earn more.

Frustrations

- I don't like the insisting customers.
- Not having the money to fulfill my goals.
- Staying long hours to the workplace.

Bio

Fabio is a bartender that works in one of the most famous hotels in the city of Bologna. He is married with Anna and they have 3 children, Michele 20 years old, Giovanni 18 years old and Silvia 13 years old. Fabio's main goal is to open his own bar-restaurant and to manage it with his family. One of the problems that he has related with the work is the late hours. He make a good use of the internet and the mobile applications. At the free time he like to watch sports on the television or in the Internet. He is a smoker and even that he works with alcohols he drinks only occasionally.

Motivation

Incentive
Fear
Growth
Power
Social

Brands & Influencers

Preferred Channels

Traditional Ads
Online & Social Media
Mobile Apps

Fabio is a bartender that works in one of the most known hotels situated in the center of Bologna. He is a very social men and likes to talk with customers. Fabio is married and have 3 children. At his work Fabio is in contact with many people and serves them in a polite and educated manner.
Fabio dreams someday to be able to open his own bar-restaurant and to manage it with he's family.
Often the hotel organize events and the music is in some sens very loud for the people that works there. Fabio think that this noise can harm he's hearing so he is looking on the Internet for hearing problems and how to prevent them.

Domenico MALDINI, 23 future Lawyer

Domenico MALDINI

"Nothing is impossible ."

Age: 23
Work: Unemployed
Family: Single
Location: Milan, Italy
Income: Absent
Character: Dynamic

Personality

Introvert	Extrovert
Thinking	Feeling
Sensing	Intuition
Judging	Perceiving

Goals

- Find a job as a Lawyer.
- Open my own studio in some years.
- Leave my father house.

Frustrations

- Searching for employment.
- Having to live with my family.
- Limited budget.

Bio

Domenico is the only son of Marco and Maria. He is a newly graduated student in Law. He lives in his family home with his parents. Domenico likes sports and specially soccer and follows his loved team, Milan. One of the other hobbies of Domenico are the motors qnd like to drive his Ducati monster around the city. His challenge is to find a job and to improve his abilities as a new Lawyer.

Motivation

Incentive
Fear
Growth
Power
Social

Brands & Influencers

Preferred Channels

Traditional Ads
Online & Social Media
Mobile Apps

Domenico is a young graduated student that hopes to find a job like a Lawyer.
He lives with his family in Milan but he like to live by himself.
Domenico like sports and fast motors. He make a very good use of the Internet and the mobile. He often visit his grandmother that lives in an flat near them.
Domenico knows that his grandmother deals with hearing loss and want to help her find a solution. The first thing he do is to search the Internet for information about the problem and for the solutions provided.

Laura MARTELLI, 52 Teacher

Laura MARTELLI

"Nothing makes me more happy than teaching to my students how to be good citizens ."

Age: 52
Work: Teacher
Family: Married, 2 children
Location: Rome, Italy
Income: Medium (20 K+)
Character: Compassionate

Personality

Introvert	Extrovert
Thinking	Feeling
Sensing	Intuition
Judging	Perceiving

Goals

- Be a good mother and teacher.
- Get the compliments of the student parents.
- Increase my life quality.

Frustrations

- When my work is not appreciated.
- When my opinion is not considered.
- Difficulties to listen low voices.

Bio

She is a teacher in primary school. She is married to Federico, a 59-year-old accountant who works for some private-sector companies. Laura loves children and works 40 hours a week. Reading magazine and surfing the net are habits she has been used to it since she is free but she is also eager to learn new stuff so she subscribed to coursera.com and sometimes she follows the courses related to his job and psychological courses specific for children. Since she is family oriented, she spends all the weekends with her family and her parents.

Motivation

Incentive
Fear
Growth
Power
Social

Brands & Influencers

Wikipedia, MaxMara, coursera

Preferred Channels

Traditional Ads
Online & Social Media
Mobile Apps

Laura is a elementary school teacher. She passes half of the day at school with her students. Laura lives in Rome with her husband and their 2 children.
Laura is a very compassionate and sensible woman. She has a nice way to do things, very educated and behaves like a second mother to her students.
At the free time at home she like to read books, to navigate at the Internet, usually she search information about teaching, child psychology and general news sites.
She is also a very good cook and everybody like her dishes.
The last years Laura is experiencing some problems with her hearing and she thinks that before go to have a visit to the doctor she may want to look on-line for information about hearing.
She is a good user of the Internet and she has a personal computer at home that she mainly use to work.

Gianluca CAVALLO, 55 Audiologist

Gianluca CAVALLO

"I want to be successful at everything that i do ."

Age: 55
Work: Audiologist
Family: Married, 2 children
Location: Turin, Italy
Income: High (100 K+)
Character: Logic

Personality

Introvert — Extrovert
Thinking — Feeling
Sensing — Intuition
Judging — Perceiving

Goals

- Be successful at my job.
- Grow my business.
- Buy a new house in the seaside.

Frustrations

- When i have problems at the work.
- When i'm not in charge of my businesses.
- Inefficiency.

Bio

Gianluca born in Turin, the city in the North Italy where he studied and become an Audiologist. He married with Carla, a Psychologist and they have 2 children. Gianluca loves the sea and like to buy a house near the sea. In he's free time Gianluca likes to read to watch television, to navigate the Internet and to walk on the cities park.

Motivation

Incentive
Fear
Growth
Power
Social

Brands & Influencers

ROLEX

Preferred Channels

Traditional Ads
Online & Social Media
Mobile Apps

Gianluca is an Audiologist, a kind of doctor that deals with people with hearing problems. He lives in the city of Turin and is married with Carla. They have 2 children.
Gianluca works at a private clinic and is one of the mos appreciated members of the team. He is a very smart and positive person. He spend mos of the day at his office where he visit the patients.
He is a very good user of the Internet as he used it a part of he's job. He use the office computer at the clinic and a private laptop at his house.
Gianluca like the seaside and his dream is to buy a new house near the sea.
In order to be informed about the last technologies and devices in his profession he use the Internet to navigate and to search about different sites that deal with hear problems and with solutions provided.

Personas created using xtensio (xtensio.com)

Valentino RESTA, 60 Truck driver

Valentino RESTA

"Sometimes the only thing that i can hear is the noise of the truck engine ."

Age: 60
Work: Truck driver
Family: Widower, 1 children
Location: Naples, Italy
Income: Medium (20 K+)
Character: Practical

Personality

Introvert	Extrovert
Thinking	Feeling
Sensing	Intuition
Judging	Perceiving

Goals

- Pay my sons College.
- By my own truck.
- Work less at night.

Frustrations

- When i have problems at the work.
- When i have to pay taxes.
- When i have to travel out of Italy.

Bio

Valentino is a 60 years old track driver from Naples. He has lost he's wife many years ago and now he lives with his only son Marco. Valentino is a very practical man and when he is not traveling the Europe in his track, he use to do things at home. He is a heavy smoker and has suffer from diabetes. Valentino pass most of his time on the track. He usually travels at night and sleeps or to do other thing by day. Valentino is a discrete user of computers, he has a laptop computer at his home that is used mostly by Marco, his son, but when is at home Valentino likes to consult the mail and to see videos on Youtube or to search for information related to his trips. When away from his home Valentino uses only his mobile phone that has internet connection and some apps like Whatsapp etc.

Motivation

Incentive
Fear
Growth
Power
Social

Brands & Influencers

Preferred Channels

Traditional Ads
Online & Social Media
Mobile Apps

Valentino is a 60 years old truck driver from the city of Naples in the south Italy. He has lost he's wife many years ago and now lives with he's only son Marco. Marco is an University student. Valentino passes almost all he's time traveling allover Europe with he's truck. Valentino has a secondary school degree and a discrete user of computers. He has a laptop computer at he's home that is used mostly by he's son for the studies. Valentino is a very practical man, he likes to do things by himself. We can say that he has some unhealthy habits, because he is a heavy smoker and suffer from diabetes. When away from the home he uses he's mobile phone to connect to the others and specially to talk to he's son on Whatsapp. Valentino from long time experience hearing problems. Las time he visited the doctor recommend him to seriously think about hearing aids. The doctor shows him some possible companies that can provide this kind of solutions and Valentino after some thinking decide to search on-line this companies.

Chapter 4

Design Proposal

In this section we are going to provide the basic structure of the new design. We consider the "Design Model", the "Information Architecture" and all the characteristics related with them.
We think that CAO=S model is the most suitable to the system that we are going to design and we will adopt this model in the design process. There are many justification for this, one of the mos important is the cost and time efficiency of the model.
Regarding the Information Architecture we adopt a Top-Down model because we think that the type of web-site that we are going to design (a product and information site) is more effective and useful in this model.

Information Architecture

Information Architecture is the discipline that deals with the structural, logical and semantic design and representation of the information in such a way that is easy to access and exchange using information systems. At this process we are going to distinguish two separate field.
First, the Information design that answer the question: How information need to be designed?
Second, the Information Architecture: How the information items (content) are related to each other?

The previous phases of study and analysis have enriched our understanding with statistical and empirical data and information about our target users and other relevant aspects of the design such as the possible approaches to achieve organizational goals. We are going to use this data to create information and from information to obtain knowledge and wisdom. The following figure shows a cartoon by David Somerville and our understanding about the difference between the data and the wisdom. This is an artistic representation of the Shedroff* model of information management (fig.17).

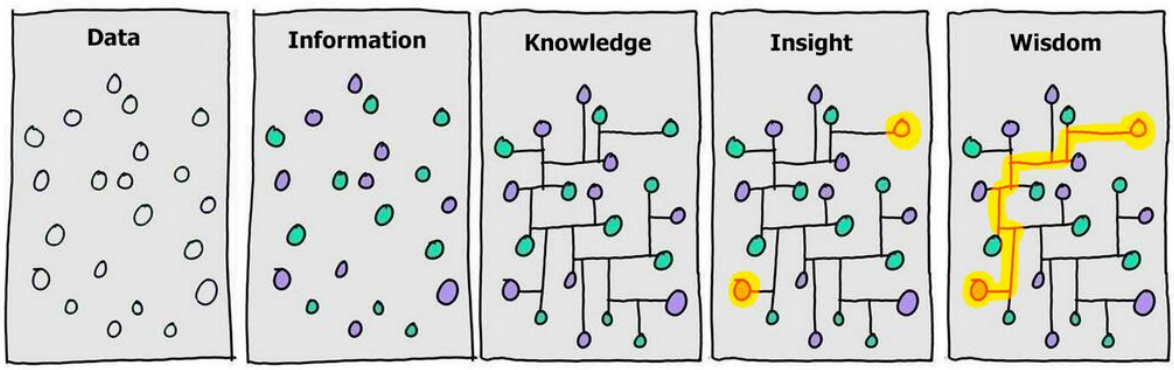


Fig.16: From Data to Wisdom

* Nathan Shedroff: "The future of Business is in Designing of Relationships".

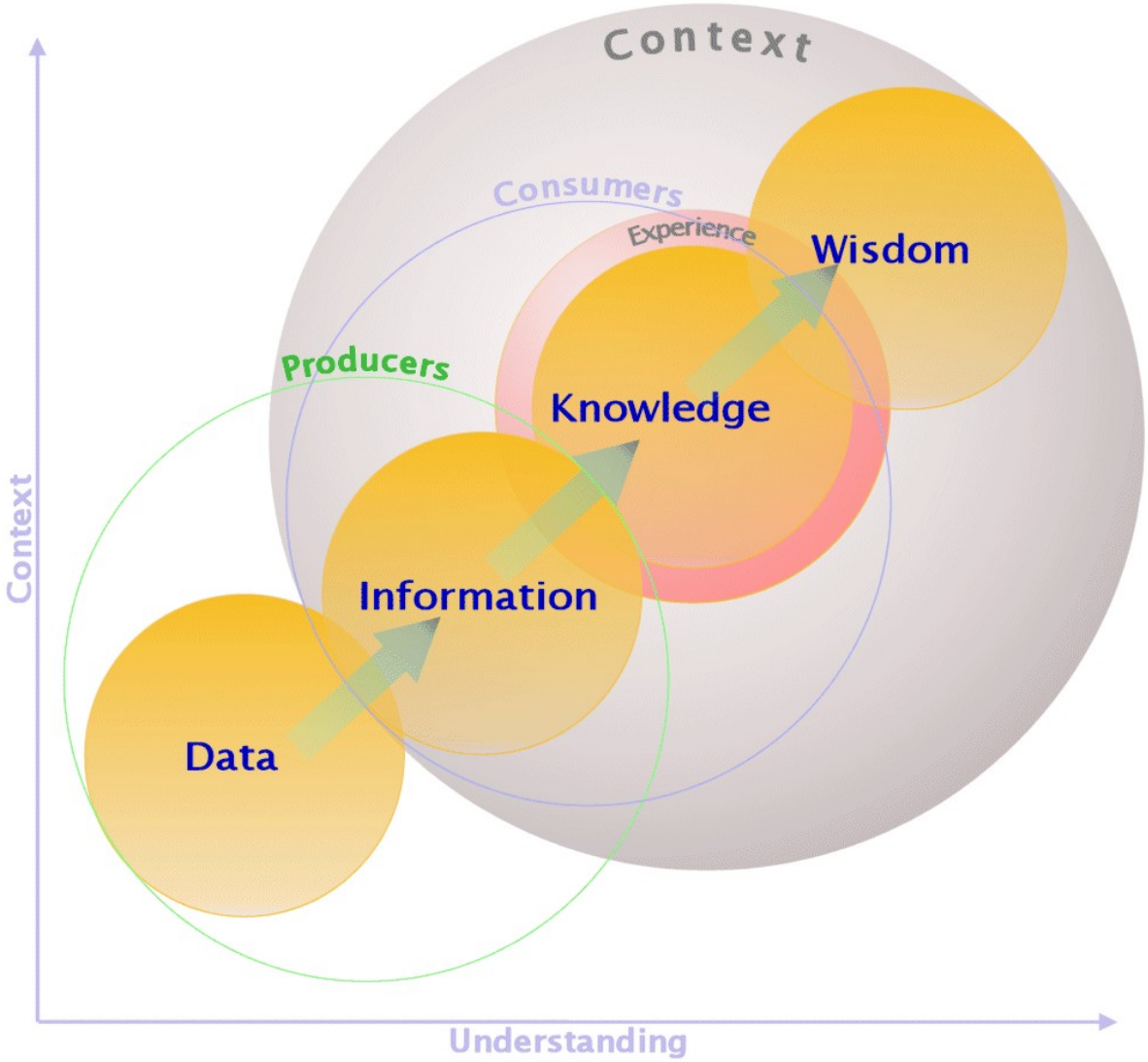


Fig.17*: Information Management by N. Shedroff

In our design we have taken in consideration the seven ways of information organization by Shedroff and have decided to select the "categories" and the "linear" as the main elements of organization. Because we want a clear and easy way to access information in the site we prefer to classify our information in a well-separated and recognized categories. Our choice is to provide as few as possible raw data and in the case we are obligate to we will prefer to put them in a simple and understandable context. For example in the case of the on-line hearing test we are going to show the numeric data as a form of information in the context of the test results. Our objective is to refine as possible the information in order to express knowledge and achieve wisdom.

* Fig.17: source (http://www.infovis.net/printMag.php?num=186&lang=2)

Information Architecture is a very broad field and contains methods for structuring, organizing, classifying and make findable and manageable the content presented in the system.
We are going to make an important effort to structure the information in simple to understand way that is easy to provide the right information to any kind of user.
Regarding the organization and the classification of the information we are going to classify related information is the same class and order this information based on the importance of the content. In the case there are references between contents we are going to provide explicit links and pointer to the related information.
Regarding the access of the information we are going to include on every page the possibility to search for information on the whole site or in the page. This was a missing feature in the system that we tested in the previous phases. In our design the search field is a "must" and the search can be personalized by the user.
An important guideline for our Information Architecture at this point is the Information Ecology that relates together three concepts: Context, Content and Users as highlighted by Davenport and Prusak. Figure 18 show the three circles intersecting circles of Information Ecology.

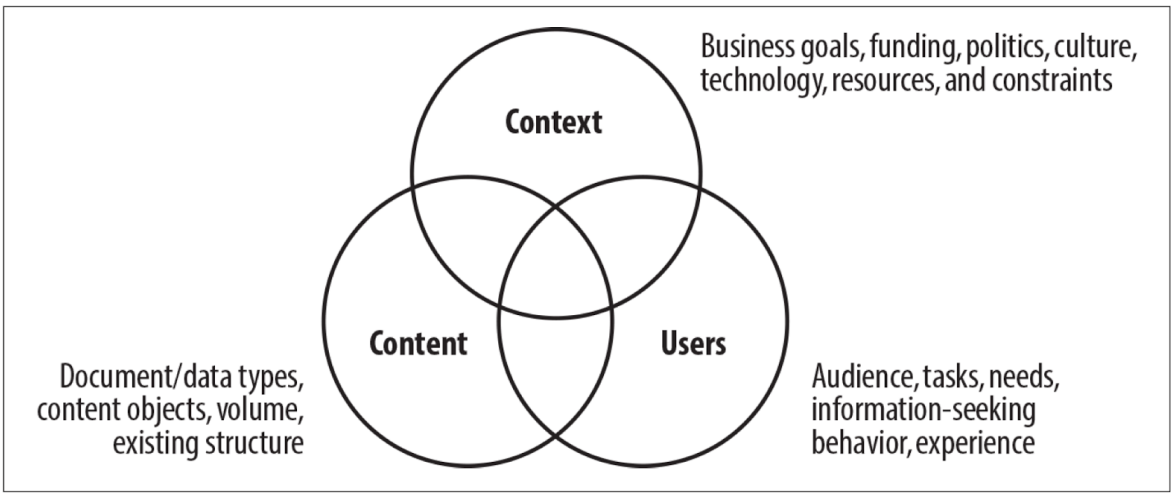


Fig. 18: Information Ecology

At this point we are going to have a quick look at each one of the circles on the previous figure.

Context: we are dealing with an commercial web-page that provide solutions and information for people that have hearing problems or need specific information about this kind of diseases. The organization goal is to provide hearing solutions and to sell this solutions to the target users. This goal is achieved with a friendly approach and with a careful design of overall layout of the web-page and the content provided. The mission of the organization is to reach the fixed goals by providing effective solutions to the target users. We have now a clear picture of our users and their characteristics and we are going to adapt the design solutions to their goals and needs.

* Fig.18: source (https://evertongomede.blogspot.it/2015/10/the-infamous-three-circles-of.html)

Content: we are opting to provide a high quality content to the users. This is include not only the quality and the necessary quantity of the information but the graphical representation of it. We avoid not familiar fonts and small font sizes. In the case of the font size we will provide to the user an explicit way to change the font size based on his/her needs. As the content may be changed over time we will provide the date of the last update in order to inform the user about the dynamism of the site.

User: until now we have done a challenging work to study and later to analyses the different possible users of our system. We are conscious that every user is different in his needs and goals so to be able to study this kind of differences we have adopted well-known techniques such as the ethnographic and other techniques of user sampling.

As anticipated we are going to use a Top-Down approach at the system design. As we mentioned previously this approach better suits our organization goal and our target user goals. The information is specified at the top layer and is further extended and explored as needed. The three main elements of the Top-Down approach in the web-site design are: the search engine, the navigational system and the clear and easy to use site organization.
At this point we are going to follow the design system proposed by Morville and Rosenfeld*.
This design system is based on four aspects: Browsing Aids, Search Aids, Contents and Tasks and Invisible Components. Let's follow the Morville-Rosenfeld method and view then one by one with reflections to our design.

Browsing Aids.
The user is presented with a predetermined set of possible navigation paths, the user do not have to input queries or difficult information, instead he follows a natural and intuitive path consisting of links and menus. Some of the elements of the browsing that we are going to pay attention are the following.

- Organization Systems - this refer to the categorization and grouping of the content. Of course there are many ways to do this and usually depends on the type of the content that we are dealing with. Some types of organization are: by topic, by tasks, by chronology, by audience etc. In our design we are going to implement an content organization based on topics and sometimes if needed on tasks. This design choice is justified by the nature of the web-page and from the need we have to be as concise and in the same time as easy to use as possible. In our main navigation bar that will be placed on the top of the Home page, the grouping of the content will be based on the topics and sometimes on tasks and this will be visually very clear to the user. As there is the possibility that some topics may be related to each other we will link them together using noticeable links. Once again we will refer to the previous studies that we have done and to the information we have collected to design the main menu and to group by topics.

* "Information Architecture for the World Wide Web" - Peter Morville & Louis Rosenfeld

- Site-wide navigation systems - this a useful tool provided by the navigation system. This tells to the user where he/she is at the moment and where he/she can go from that point. We are going to use "breadcrumbs" to achieve this objective. He think that this kind of navigation would help the user to move around web-page and to find the information or the product he is looking for.

- Local navigation systems - we will use this system to orient the user inside a page of the site. This is provided by structuring the page in sub-pages. In this case we have to set the stage in a clear way for the user in order that he understand that there is hierarchical structure on the page and show him how to access the sub-pages in an intuitive way. Every sub-page will have a visible and complete title a picture and a small summarization of the page content.

- Sitemaps / Table of contents - this are all sorts of help that we can provide to the user. The sitemap in particular will be placed on all the pages of the site and in particular in the Home page. We will place the sitemap on the footnote bar of the pages.

- Site index - we may provide site index if needed but this feature may be added to a next implementation of the site. We consider that the sitemap is enough for the moment.

- Site wizards - we are going to use site wizards in the case of purchases and in the case of registration if needed.

- Contextual navigation systems - we are going to avoid very specialized terms but in case we need to use them we are going to put them in a context and explain further this terms. We think that we are going to use this terms in the case of hearing diseases and other technical uses.

Description of the design based on the points highlighted for the Browsing Aids.

Now considering our design, the Home page will be organized as follows. In the top left side will be placed the site's logo that is also a link to the Home page in all other pages. Near the logo in the top middle of the page will be placed the main menu bar that consists of all the categories we are going to divide our material. In the top right side of the Home page will be placed the search engine. In a suitable point on the top of the page will be placed the language and font size settings. Under the main menu bar will be placed the content of the page structured in suitable manner. We think to put little images and small stories for each section. In the bottom of the page will be placed the footnote bar that consists of all the relevant links on the pages, sitemap, privacy policies, and socials networks etc. The main menu bar and the footnote bar will be available in all the other pages and sub-pages of the site. We will be using the "breadcrumbs" to orient the user inside the different pages of the site. When there is tasks that companies a number of steps the progress will be shown in correspondence to the number of steps left to be completed. Now regarding the search field, it will be placed in all the pages of the site excluding only the

obvious ones like the contact us and similar pages where the search is not needed. The result of the queries will be provided in ordered list with the most recent and important information on the top of the list. If there is no result on the query provided by the user the system may assume that there was an error and will provide help to the user to input a new query or a different version of the previous one. We will include on a very visible point of the Home page the possibility to conduct a hearing test that will be a page on it's own and will have all the structure needed by the user to do the on-line test and to get some valid information in form of result.

Searching Aids.
Searching allows the user to insert queries on the site and obtain information related to the query. As anticipated we are going to provide the capability to the website in order to facilitate the user. The query fields have some characteristics that we will not apply because we want a simple and intuitive search engine.

- Search interface - the search interface that we are going to implement to the site will be a single field search that will not provide the possibilities of sophisticated queries, simply because we think that our target user would never use this kind of features.

- Query language - the query language will be the natural language of the user. Of course the user may input keywords in the two languages the site has provided. We are not going to apply any sophistication on the query.

- Retrieval algorithm - we are going to use a simple algorithm that looks for patter-matching between the keywords provided by the user and the content on the website.

- Search zones - we will provide search possibilities on all the relevant pages of the websites excluding those pages that this feature is not needed at all.

- Search results - the results will be provided on a list in order of importance and freshness of the information.

Content and Tasks.

Content and tasks are embedded on the Information Architecture and are the user's ultimate destination. We are going to consider:

- Headings - are labels associated with some content. In our design the heading will be placed on the top of the content and in a suitable font size that will make to recognize it. The headings will have a meaningful and representative title.

- Embedded links - are links inside a text area. In our design the distinction between normal text and links will be clear and will be highlighted using

different colors. The embedded links will have a dark blue color and when clicked once they will change the color permanently.

- Chunks - are logical units of content. In our project we are going to use chunks of content in the section provided in the Home page. This chunks will as an anticipation of a section or a page, the user can view the whole section or page by clicking on a link like "learn more" for example.

- Lists - we are going to use lists to organize item such as the result of a search or chronological information like the list of articles ordered by the time of their creation. Other kind of list may be used to list the products that can be listed based on different characteristics like the price or the popularity.

- Sequential aids - are the visual help provided to the user by the system in the case that there is a sequence of steps to be executed for the completion of the task. In our design in cases of sequential operation the system will provide in clear and intuitive way the number of total steps, the actual number of steps executed and the remaining number of steps. For example 3 of 5 steps to the completion.

- Identifiers - we are going to use "breadcrumbs" as a visual element to help the user understand his actual position on the page. Breadcrumbs are very diffuse and simple identifiers.

Invisible Components.

Invisible component are elements of the system that usually are hidden from the users. This includes different vocabularies, thesauri, algorithms etc. In our design, taking into account the overall size of the website we are not going to use sophisticated invisible component. Only in the case of the search engine we will consider an easy algorithm of patter-matching. The sorting of the information will be as mentioned previously by relevance and by freshness.

Design Model (CAO=S)

As anticipated previously, we are going to adopt the CAO=S design model. This is an obvious choice because combine together the goal-oriented design, the paradigm that we have followed during the entire project until this point and the economical efficiency.
This model is based on the study of the information types (concepts) that the application must manipulate on behalf of the user types (actors) by providing commands (operations). A correct analysis of these allow to generate the three types of structures managed by the model, views, data structures and navigation. We are going to consider all the factors of the CAO=S model one by one and highlight our design choices for each of this factors.

Concepts.

Concepts are the way in which the users perceive the organization of the information managed by the application. This is deduced from the analysis of the raw requirements (unprocessed and not homogenized) collected in the field. They are often nouns and adjectives. The interface must indicate operations on the concepts, and not functions of the data structures.
In the project we are going to address the major problems concerning the concepts.

- Standardization problems - we are going to choose carefully the language to use in the site, this is because we know that we are addressing a specific problem and the target users may be of different education and cultural backgrounds. We are going to give a special emphasis to the direct users of the web-page. Normally the language should be suitable even for the second and third characters. In case of technical terms, we are going to explain them each time we use them.

- Conceptual differences - we put a special effort to explain the terms in a more than a word, in the way that is better suitable for understanding of the ideas and concepts we are defining.

- Polysemies - are words or terms with more than one meaning. We are absolutely avoiding this kind of situations. The word will be ease to understand and straightforward.

Concepts at the homepage.

Home page is very important since it has the first impression on the user or the potential consumer. The point is that Home page should contain the concepts each of which has at least one actor.

- The logo of the company is a concept that reminds the user, the brand which may conclude in customer loyalty. Is is better for all the users to be able to see the logo in a fixed position at each page.

- Presence of basket (or something similar and common) as a symbol and metaphor for buying.

- Online chat which rings a bell in the user's mind of presence of help.
- Hearing test, reminds the possibility of an on-line consult.

- Contact us, reminds the metaphor for support.

Actors.

The most important element on the CAO=S model are the Actors. We are designing the model around the Actors. CAO=S model describes two kind of authors, the direct actors and the indirect authors. For each actor a hexagon

of characteristics is provided. We have to give a value in the range 1 to 5 for each characteristic. The area that is formed in the chart represent our user group. The six characteristics of the chart are:

- Technical competences - is the knowledge of the user related to the technology. For example users that are familiar on the use of Computers, mobile devices or different applications and programs. Usually the technical competencies of the users are multidimensional and the medium user have some sort of familiarity with modern technology. In our design we assume that the main characters have some sort of knowledge and are users of one or more devices.

- Domain competences - is the familiarity that the user has with the domain, this include terminology, possible actions and behaviors etc. In our case the terminology used in the site is almost free of difficult and not familiar concepts and terms. In the case there is used a technical term we are going to explain it in natural language suitable for the typical user.

- Language competences - generally in this design we assume that the users speak good italian, but in order to not exclude nobody from the use of the website we are providing another language. The users can change the language they want to use in the navigation on the site. We are going to provide the english language as optional on the website. Because of the peculiarities of the product and services we are dealing with the use of other languages is not necessary.

- Physical ability - taking into account the possible physical limitations that the user may have and to correct the designing process in order to provide aids for users with this kind of limitations. In our design the physical limitations are taken care in the normal cases. Of course we are not considering here borderline users that have paralysis or other forms of impediments. In those extreme cases we assume that a relative of the invalid individual is taking care of this stuff.

- Motivations - responds to the question: Why I have to use the system, which are my motivations to do so? The motivations may be of different nature and importance. In this project the users is given an aid to find a product that he needs or he may need. So this is one of hundred possible sites that provide this kind of service or product. The idea is that if the user has the need to search for the product he may search on our site and fix an appointment with an office or find some useful information. The motivation have to be studied case by case but as a general idea we assume that the user has some form of motivation because we are talking about a product that resolve an important health problem.

- Concentration - is related with the distraction around the user, factors that my delay or interrupt he's interaction with the system. In general the type of interaction that we are considering is something that can be done in a familiar environment, like home or office. We are motivated to assume that the environment is quite and with no major factor of distraction, because in

the case of an environment with distraction the user should postpone the activity for another moment or another place.

Now let's have a closer look to the actors.

Direct Actors.

We further divide the actors in four classes regarding the type of the interaction they have with the site.

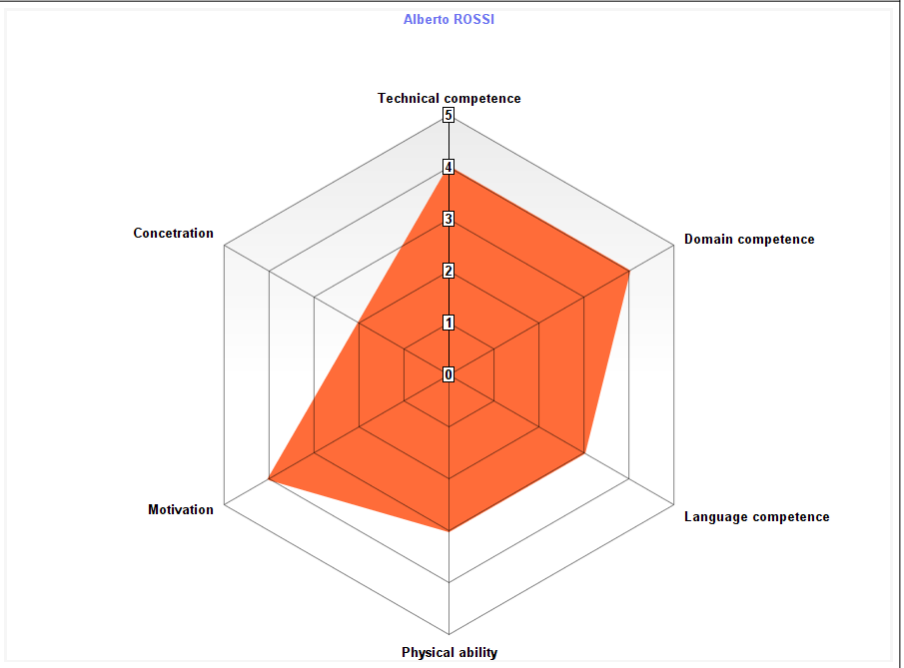
- In-need - are the users who already experience aural problems more or less or prone to and wish to treat it.
- Potentially in-need - users who do or are prone to experience aural problems themselves and are looking for information.
- Approached users - users who do not experience aural problems, however there is a family member or a relative who is suffering from aural problems and they care.
- Advisers - users who do not experience aural problems themselves, but are looking for information. However they might advise others or encourage in-need or potentially in-need users to use the products listed on the website. (in this group we include doctors, shop keepers, pharmacists etc).

Indirect Actors.

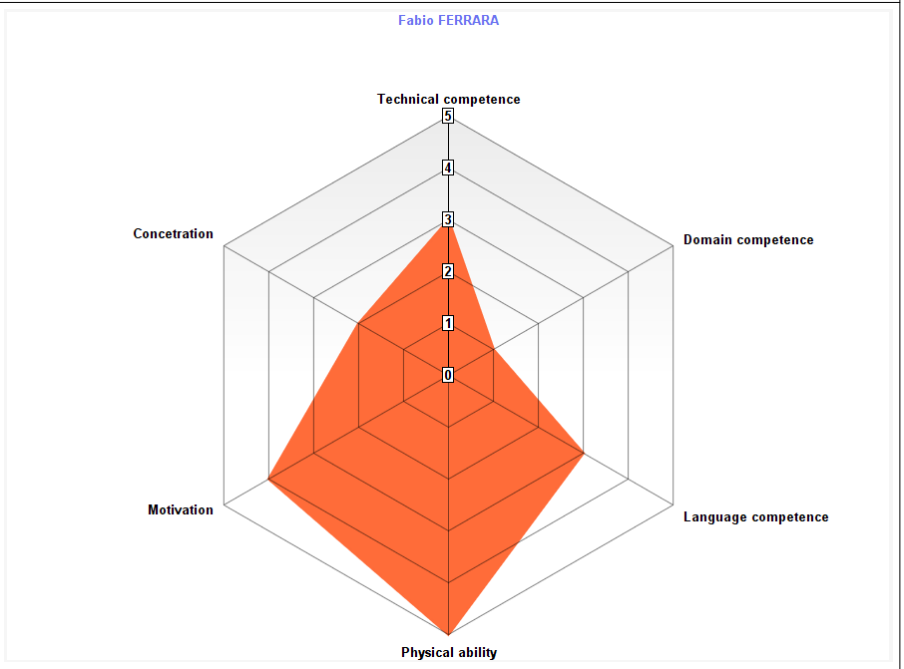
Indirect actors are those individuals that have a role in the design or the specification of the system but are not going to use it directly. Usually this category include costumers, technicians, current legislation etc.
in this project the indirect actors are the design and projecting team. Of course we have considered the current legislation and may consider suggestions from the final costumer in a later deployment circle of the system.

In the following pages we are going to show the Strategy Diagram for all the actors we have considered on the project.

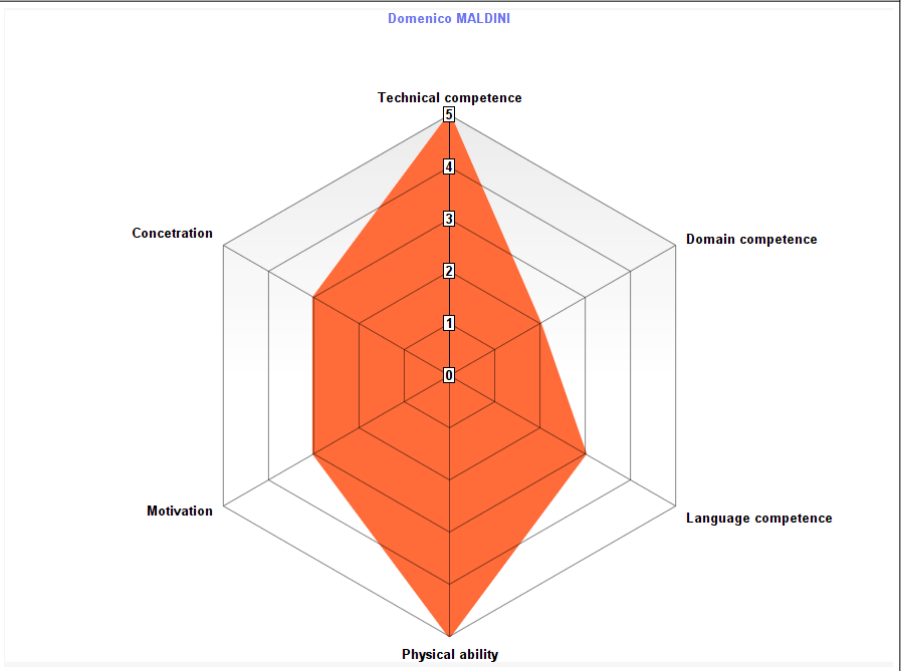
Alberto ROSSI, dentist

Characteristics	Evaluation	Strategy Diagram
Technical Competence	4	
Domain Competence	4	
Language Competence	3	
Physical Ability	3	
Motivation	4	
Concentration	2	

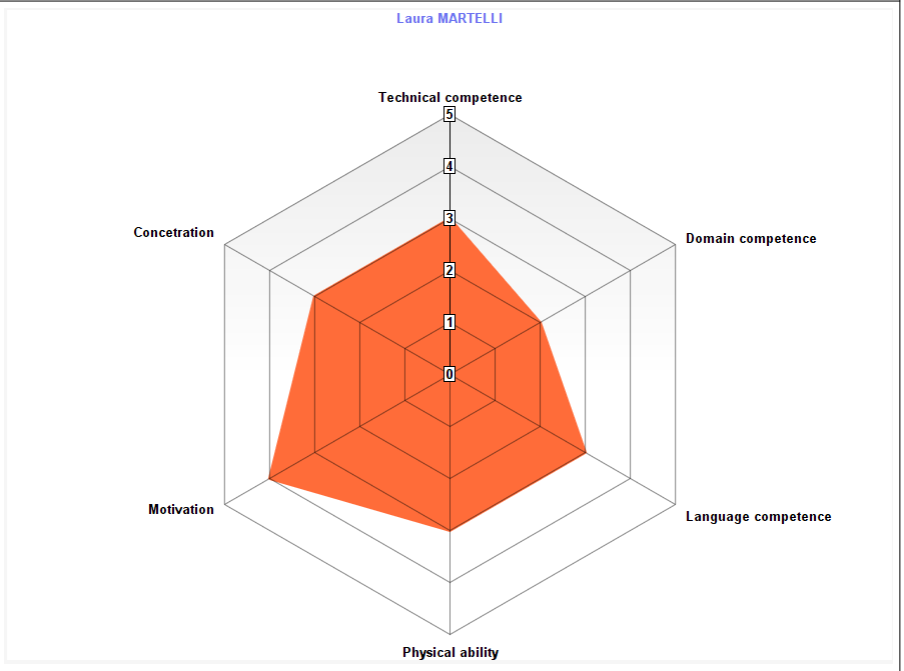
Fabio FERRARA, bartender

Characteristics	Evaluation	Strategy Diagram
Technical Competence	3	
Domain Competence	1	
Language Competence	3	
Physical Ability	5	
Motivation	4	
Concentration	2	

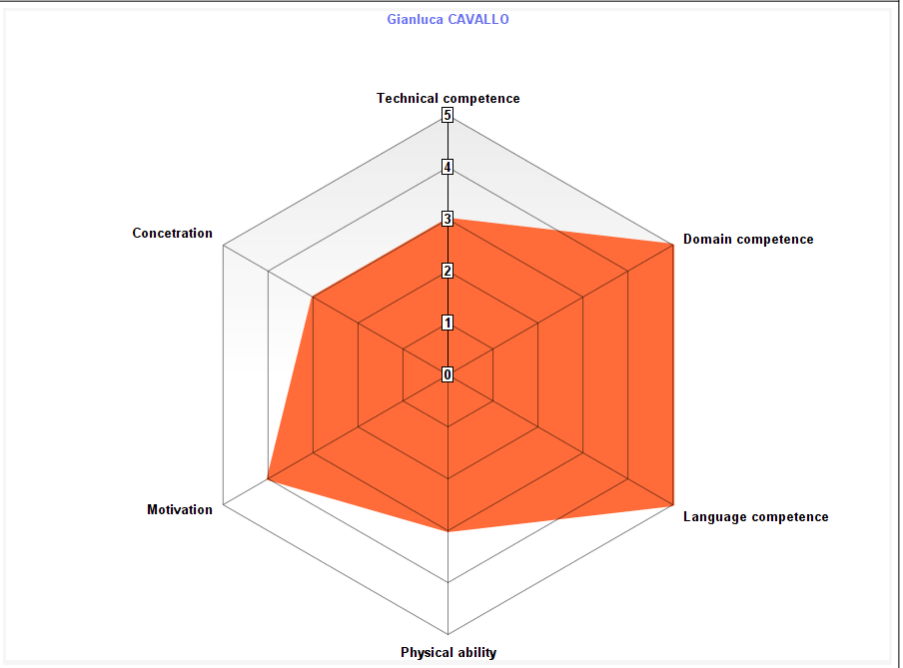
Domenico MALDINI, student

Characteristics	Evaluation	Strategy Diagram
Technical Competence	5	
Domain Competence	2	
Language Competence	3	
Physical Ability	5	
Motivation	3	
Concentration	2	

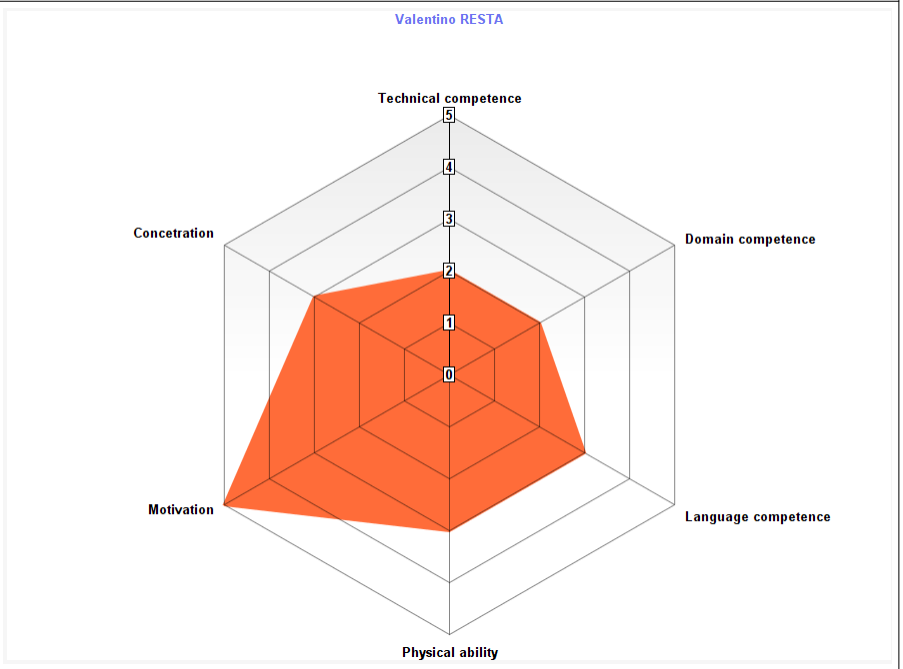
Laura MARTELLI, teacher

Characteristics	Evaluation	Strategy Diagram
Technical Competence	3	
Domain Competence	2	
Language Competence	3	
Physical Ability	3	
Motivation	4	
Concentration	3	

Gianluca CAVALLO, audiologist

Characteristics	Evaluation	Strategy Diagram
Technical Competence	3	
Domain Competence	5	
Language Competence	5	
Physical Ability	3	
Motivation	4	
Concentration	3	

Valentino RESTA, truck driver

Characteristics	Evaluation	Strategy Diagram
Technical Competence	2	
Domain Competence	2	
Language Competence	3	
Physical Ability	3	
Motivation	5	
Concentration	3	

Concepts that Operations manipulate.

Now we are going to have a look to the concepts that Operations manipulate. The Concepts that we are considering are the following:

- Articles - are sections of text and images used to provide information about product or general news.
- Hearing-Test - is an dynamic function that permit to the user to conduct an on-line hearing test and get the result at the end of the test.
- Order - the user may make an order to purchase a product. There is shown at every page the shopping basket.
- Account - the users if they want can create an personal account.
- Online chat - the users can have access to an on-line chat if they need it.
- Query - the users may create a query and view the results of that query on the whole system.
- Appointments - is the possibility the fix an appointment to an office using the site.

Operations.

The operations are the actions that the actors can do to the concepts. Here we are talking at high level considering concepts and not singular data structures or other low level implementations.
The CAO=S model allows four kind of operations:

- Creation - is the process of creating one or more instances of an original concept in its initial state. The creation operation has the following properties:
  - types/default/multiplicity/persistence/user_memory/failure_notification.
- View - are used to display instances of a concept in an easy to understand way. The view can be implemented in different ways, for example:
  - full individual view
  - individual reduced view
  - multiple view (list)
  - multiple view (lookup)
  - multiple view (summary)
- Update - is the modification of one or more properties of instances without creating new ones.
  - Global updates
  - Specific updates

- Remove - is the removal of one or more entities form the system or from the attention of the user. There are two ways to remove an entity form the system, either permanently or hiding it.
  - Deletion
  - Achieve

Structure.

The CAO=S model has 3 structures:

- Data structures
- Views
- Navigation

The fundamental part of the CAO=S model in general is the “main diagram”, a three-dimensional table that connects together all the elements of the model, actors, operations, concepts and create structure.

In our design all the actors can do the same things on the system, in the sens that the system is not discriminatory regarding the type of users. The following table represents the main diagram for the users.

Table 19: Main Diagram (first part)

User	Articles	Hearing Test	Order
Create	---	The user can execute any number of tests they want. Type: manual Multiplicity: infinite Persistence: just in the section Default: headphone testing	The user can place an on-line order. Type: manual Multiplicity: limited only by the number of available items. Persistence: just in the section. Default: 0 User_memory: the number of items already chosen
View	Individual, reduced, list, lookup, summary	The user can see the entire test and not part of it. Individual: Yes	The user can view the whole order or part of it. Individual: Yes List: Yes
Update	---	---	The user can update the whole order or part of it. Global: Yes Specific: Yes
Remove	---	---	The user can remove an order before submitting it. A user can archive an order for a future purchase. Remove: Yes Archive: Yes

Table 19: Main Diagram (second part)

User	Account	Query	Appointment	Online chat
Create	The users can create a personal account. Type: manual Default: none Multiplicity: 1 Persistence: forever User_memory: save the user and password	The user can submit queries on the system. Type: manual Default: none Persistence: just for that query. User_memory: previous queries	Every user can fix an appointment. Type: manual Default: none Persistence: for the time till the date of the appointment. User_memory: remember the user at each access about the appointment.	The users can initiate an on-line chat section. Type: manual Default: none Persistence: in the section User_memory: none
View	Every user that has an account may see every part of it. Individual: Yes Specific: Yes	The user can view the queries that he has submit. Individual: Yes List: Yes	The registered users can view the appointment at any moment at any time, the other users can view only the received confirmation to the email address. Global: only registered users. Specific: every user	The user can view the actual chat and the previous ones.
Update	Every user can update he's account. Specific: Yes Global: No	Every user can update a query and can see different results. Specific: Yes	Registered users can update appointments at any moment, not registered users cannot, they have to fix a new one. Global: registered users only Specific: all the users	---
Remove	Every user can remove, delete he's account. Elimination: Yes Archive: No	---	All the users can remove an appointment, but the procedure may be different	The user can close a chat at any time. Elimination: Yes Archive: No

Interaction Design

Interaction Design is concerned with describing possible user behavior and defining how the system will accommodate and respond to that behavior. We are going to use an hierarchical approach on the overall site organization. At the top level stands the Home page and from there we can access the other pages. In the previous chapters we have considered the conceptual model of the site and now we are going to visualize it using the blueprints. The figure below shows the top-down architecture that we are going to employ on the design of the site.

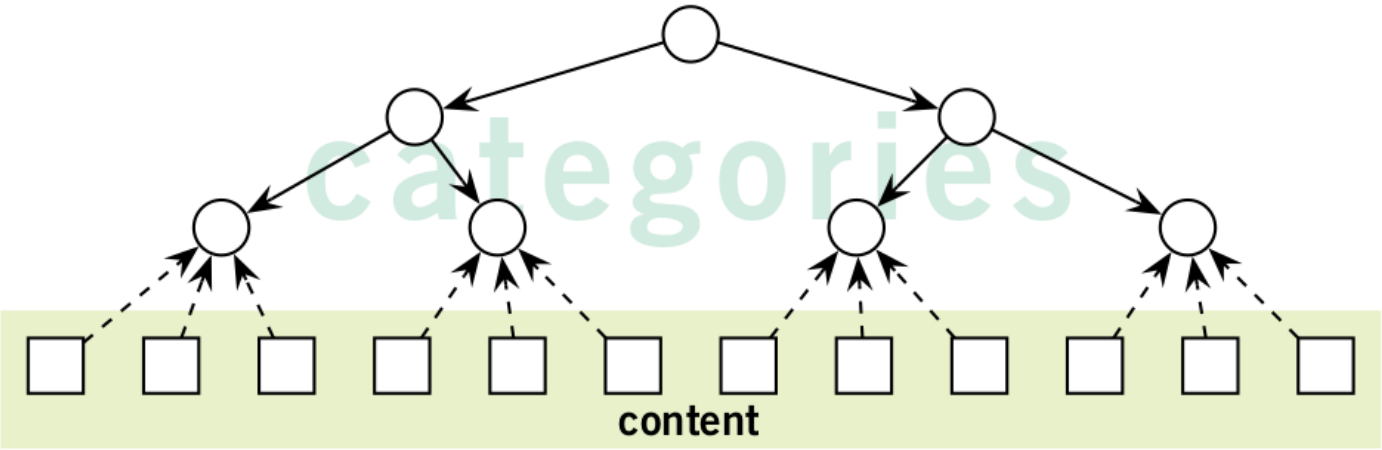


Fig. 19: Top-Down Architecture of the site

The final interaction design model is provided in the following chart.

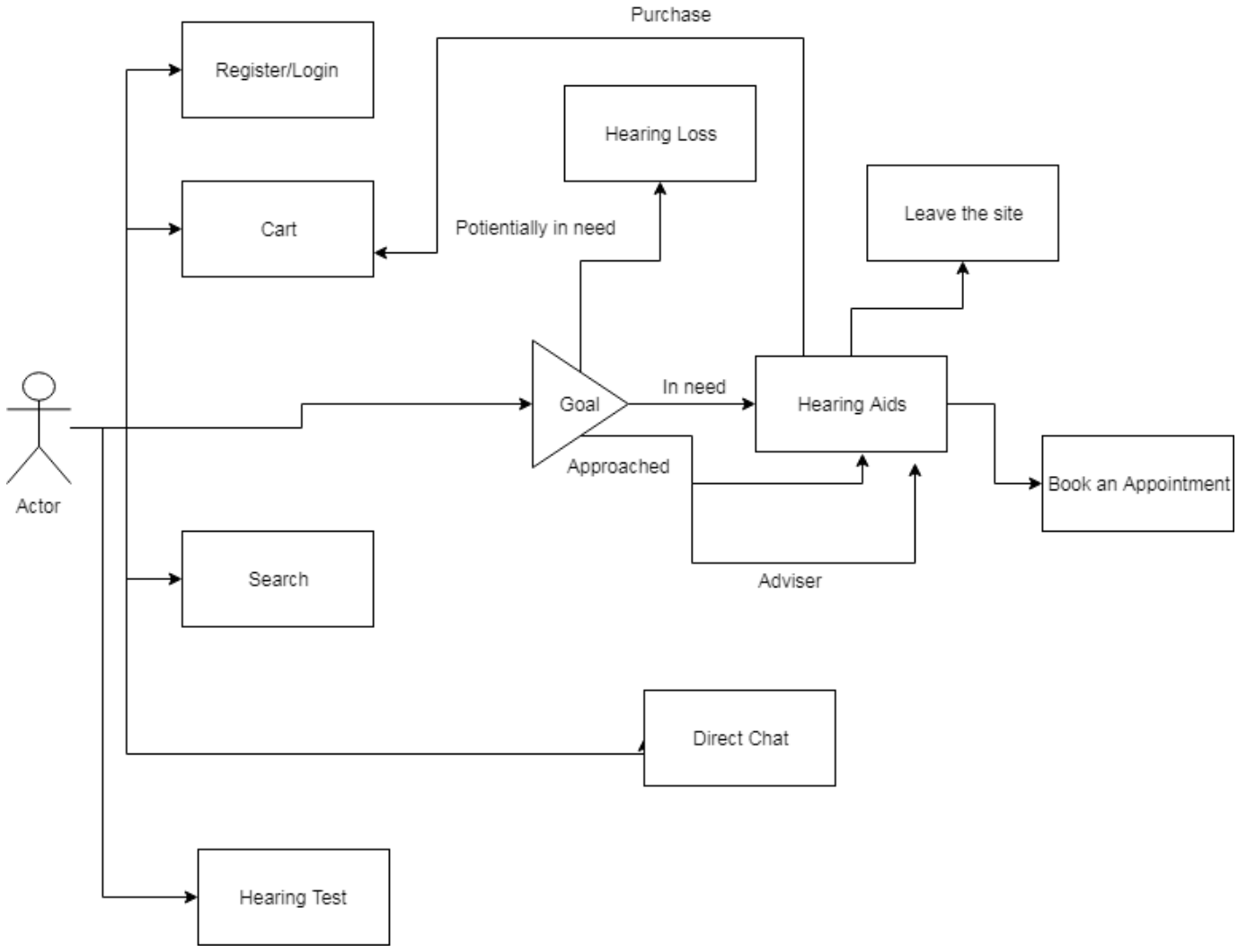


Fig.20: Interaction Design

The error handling mechanism responds to the question of: - what does the system do when the user make a mistake? The approach that we are using is divided in three steps:

- Preventing the errors - the system assume that the users are error prone and do the impossible to prevent them.
- Correcting - if an error happens the system search for the best way to correct it.
- Recovery - the last stage of the error handling is the recovery form the error.

Blueprint

Blueprints are a way to represent the organization of the content in the website.

The figure 21 represent the blueprint of our website.

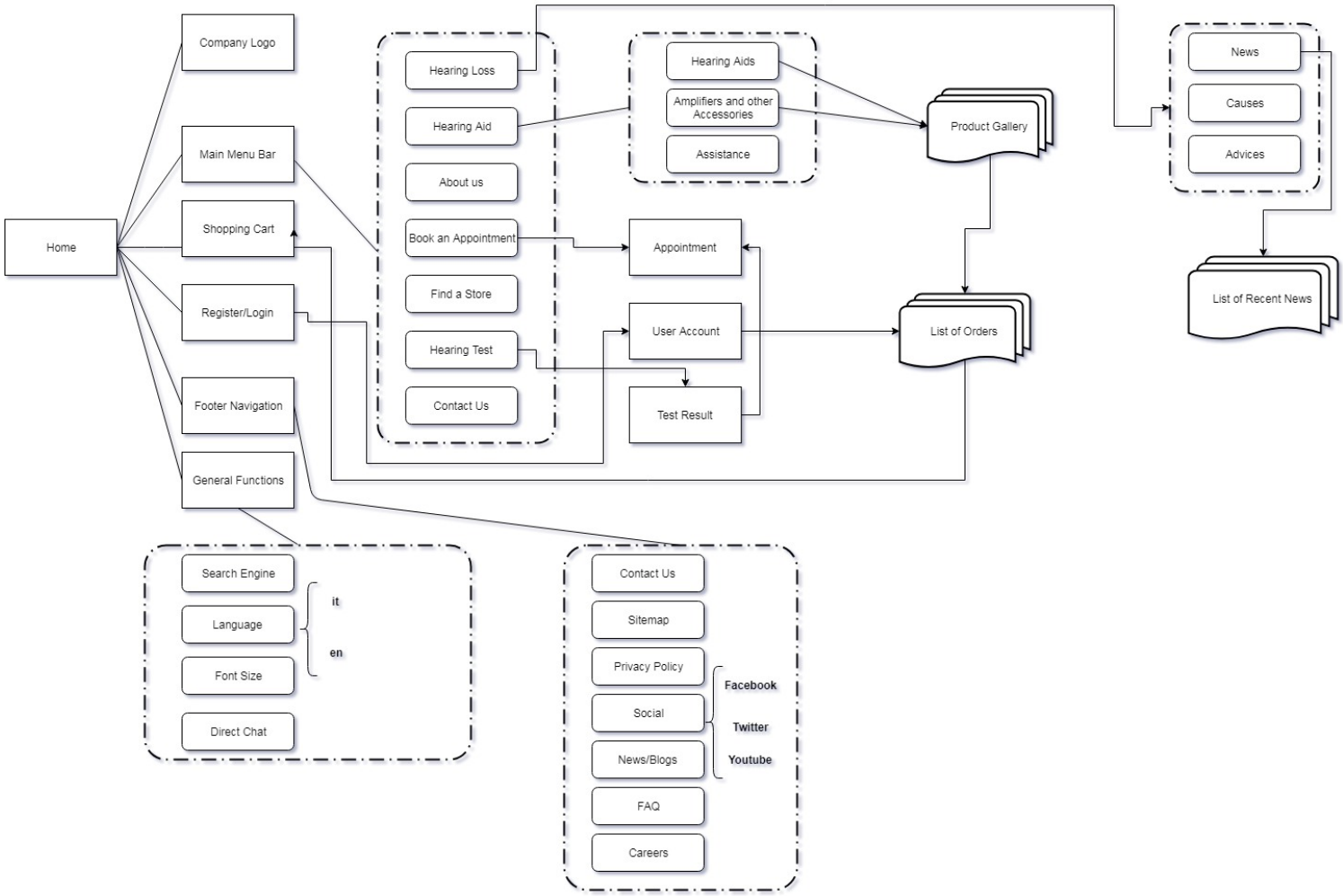


Fig. 21: Blueprint of the website

Wireframe

The wireframes are an essential part of the project design, because allows to visualize the fundamental parts of the artefact in a high fidelity manner without compromising the quality and the coasts of the final work.
This way the design team can produce a prototype of the system, conduct actual testing and obtain real results without having to construct the entire system.
The problems and the errors detected in this phase can be solved easily just by changing the individual wireframe.
We present the wireframes in a particular document entitled “Final Design”. This document contains the most important wireframes used on the system design and the justifications for each one of them. We invite you to view this document for more details.

Chapter 5

Evaluation Of the Design

Inspection

As we already know, the Inspection process consist of three important phases:

- Cognitive Walkthrough - is a fictional step by step execution of a task, usually by a team member.
- Action Analysis - is a quantitative analysis of each specific action.
- Heuristic Analysis - the use of well-known heuristics to evaluate the system.

In this project we are going to perform the Cognitive Walkthrough, Action Analysis and the Heuristic Analysis.

Cognitive Walkthrough

We are going to perform Cognitive Walkthrough as the first method of Inspection. One component of the design group is going to pretend that he is a normal user and is going to perform four specified tasks. The tasks that we are going to consider are the ones that we think that are the most probable for a common user.

Task 1 (main user) : "Find the closest shop near your home and fix an appointment using the website interface"

Task 2 (main user) : "Perform an online hearing test"

Task 3 (main user) : "Search for general information regarding the hearing health"

Task 4 (secondary user) : "Go to the site and look for information regarding new devices and their characteristics"

As we know there are four main ingredients for the CW.

- A description or a prototype of the interface, as detailed as possible. In this phase we are going to use our project wireframes. The wireframes are a low level design of the final work but in the same time they fulfill the job of giving a very intuitive are complete representation of the system.

- Description of a task, possibly one of the tasks described as representative in the task-based or goal-based design.
  Here we are going to consider some of the task that we already have seen in the task analyses phase. There are four task to be performed, three of them are for the main users and the fourth one for the secondary users.
- A complete and written list of actions necessary to complete the task, the so called "happy path".
  We are going to provide for each of the tasks a sequence of steps that we consider to be the ideal one.
- A clear description of the User and his/her skills and expectations. For this we are very good candidates, our personas.

Now based on this four ingredients, for each task we are going to create a story and to evaluate its credibility.

Task 1 - Valentino

“Find the closest shop near your home and fix an appointment using the website interface”

Happy Path:
Once you open a browser and digit the website address (www.voice.com) you will see the main menu on the top of the Homepage. Here you can proceed in two ways. Click the button “Book an Appointment” or click the button “Find a Store”. Both can lead to a successful completion of the task. In this case we suggest to follow the first path. When you reach the “Book an Appointment” page you will be faced with two options: Registered or Non registered. If registered you just choose a date and a shop for the appointment. If not registered you have to fill the form and submit.

User:
Valentino opens Google Chrome and in the input field writes the address of the website. After that he press enter and the Homepage of the company opens. He looks the big pictures on the middle of the page and a while later he focused on the main menu bar. He look the buttons and decide to press the button “Book an Appointment”. In the new page that opens he looks the two columns and he decide to fill the forms because he knows that he is not registered on the site yet. He write the name, and the phone number but forget the surname. He ticked the Phone radio-button and the submits. There is a problem and the field called “Last Name” become red and a text appears over the input field. “This field is needed”. Valentino write hes last name and submit. A while later he received a sms containing the text: “Your request has been submitted, you will be called later by an operator. Thank You, good day”.
The user haven’t face any particular problem on performing this task.

Task 2 - Laura

“Perform an online hearing test”

Happy Path:
Go to the website of the company. On the main menu bar locate the button “Hearing Test” and click on it. Read the few instruction about the headphone set or the computer audio output. When ready start the test clicking the button with the same name. Follow the steps and answer the questions. At the end of the test click the button view results. At this point you can choose if you want to print them, to book an appointment or other.

User:
Open a browser, (Google Chrome) and inserts the website address on the input field of the browser. Laura look the Homepage and scroll down the page to see till the end of the page. She goes up again and focus on the main menu. She

locate the button “Hearing Test” and click on it. When the new page is opened Laura looks the picture on the top and then start reading the instructions of how to conduct the test. She has not a headset, so she is going to perform the test with the audio coming out from the Laptops speakers. She found the volume button on the computer panel and change the volume as requested by the site. After this simple settings Laura decides to start the test. She listen carefully the audio and at the end of each one she answer the questions. When the test finished she visualize the results. Now she has an idea about her hearing and she decide what to do after.

Task 3 - Domenico

“Search for general information regarding the hearing health”

Happy Path:
Go to the website of the company. On the main menu bar at the top locate the button “Hearing Loss” and click on it. On the tab table shown on the center of the page click the tag that you are interested for. One option may be “Causes of Hearing Loss”. Read the text and view the images as needed.

User:
Domenico uses hes tablet to search for information. He enters the address of the site on the browsers input field and click enter. At the Homepage at first sigh he look the main menu and press the button “Hearing Loss”. From here he looks the first tab information and later moves to the second one “Advice for a Healthy Hearing”. At the end he views the “News” tab and then finish the task.

Task 4 - Gianluca

“Go to the site and look for information regarding new devices and their characteristics”

Happy Path:
Starting form the Homepage of the site click on the button “Hearing Aids” located on the main menu bar. Here on the tab table you can choose the type of articles you are interested for. There are two categories of articles, hearing aids accessed from the tab “Our Hearing Aids” and amplifiers and other accessories accessed by pressing the tab with the same name. Very important to know that the articles of the first category cannot be purchased online because you need doctor receive and other type of controls. The second category are ordinary devices that you can buy online.
Now once you have decide that you are interested for the hearing aids you click on the icon “Product Gallery” or on the link “Our Products and services”. From here you will be addressed to the “Product Gallery” page for this category of products. On the “Product Gallery” page you can view all the products and if you need more information about each product you just click on the image. In the new page that will open you can find all the information you are looking for.

User:
Opens the browser and looks on the Homepage. Scrolls down the page to see the pictures that he is looking for. Clicks on one of the big pictures in the center of the page. See what happened and understand that was an error and turn back with the browser navigational buttons. Looks the main menu bar and locate the button “Hearing Aids”. Press that button and the page opens. Scroll the page and looks the pictures in the section best selling products. Clicks on one of the items and goes to the page describing that particular item.
The task may be considered completed but the path that the user used is not the most natural one.

Action Analysis

Represent an evaluation process that closely examines (in extremely close details sometimes) the sequence of actions to be performed to complete a task. There are two type of analysis:

- Formal action analysis: GOMS
- Informal action analysis: “back-of-the envelope action analysis”

In this work we are going to consider the second type of analysis, in the sense that we are going to consider the big picture and not the micro steps.
Our evaluation of the system will try to answer questions like:

- Can I execute a simple task in a simpler manner?
- Can I perform a frequent task quickly?
- Can I have a good performance on using the system for the first time?
- When I come back to the system after some time, do I remember the steps for achieving a goal?
- Can I use shortcuts to save some time?

This and other similar question will be taken in consideration in this phase. We will study the four tasks listed previously and will show the results in a table.

Task 1:

"Find the closest shop near your home and fix an appointment using the website interface"

Table 20: First task

Question	Answer
How difficult is this task to execute?	This is a simple task to execute, because the path and the steps are clear and posed in a central part of the page. In the main menu bar.
Can I perform this task in fewer steps?	Yes, if the path is the right one it need minimum number of steps to get the task done.
Do I need to previously learn or remember the steps?	Is not necessary, the task can be done efficiently at the first try.
Can I achieve the same result following different paths?	Yes but the efficiency is lower.
Is there a risk of error and its severity?	Yes, but the severity is only in the time you waste looking around for another solution.
How is the learnability curve?	It takes only a few minutes to learn and to use the entire website. Everything is intuitive and easy.

Task 2:

"Perform an online hearing test"

Table 21: Second task

Question	Answer
How difficult is this task to execute?	Medium, you just have to be familiar with the settings of the PC or other device you are using.
Can I perform this task in fewer steps?	If the correct path is followed the number of steps are minimal.
Do I need to previously learn or remember the steps?	For a first time user may be a little tricky but if you try it for a second time everything should be very easy and mechanical.
Can I achieve the same result following different paths?	No, you loose performance.
Is there a risk of error and its severity?	Yes, the severity may be high because my influence the result of the test.
How is the learnability curve?	High, it takes one try to learn and is very easy to remember.

Task 3:

"Search for general information regarding the hearing health"

Table 22: Third task

Question	Answer
How difficult is this task to execute?	Medium, there is a possibility that you start with the wrong path and loose some time.
Can I perform this task in fewer steps?	Yes, follow the suggested path.
Do I need to previously learn or remember the steps?	No
Can I achieve the same result following different paths?	You can get to the same information but not with the same result in performance.
Is there a risk of error and its severity?	No, just time spending.
How is the learnability curve?	High

Task 4:

"Go to the site and look for information regarding new devices and their characteristics"

Table 23: Fourth task

Question	Answer
How difficult is this task to execute?	High, because its need to go through different pages to reach the desired result.
Can I perform this task in fewer steps?	Yes, but it will be not complete
Do I need to previously learn or remember the steps?	It will be good to have an idea of where to locate the information that you are looking for.
Can I achieve the same result following different paths?	Yes and No, you can achieve some result but not the optimal one.
Is there a risk of error and its severity?	Yes, but is just spending more time to find out how to get to the result.
How is the learnability curve?	Medium, in the second run you will not have problems of performing this task.

As you can see form the tables, the tasks are easy to perform and the number of steps is not large. Problems may rise when the user is not paying much attention on the steps that he or she is doing and do not follow the most natural and intuitive path. Even in this case the errors are not very severe. The most important buttons and parts of the site are located in the most central place and highlighted in a natural and easy to use mode.

Heuristic Analysis

This type of analyses has the objective to verify the system's adherence to guidelines identified by the design team. Usually this guideline (heuristics) are well-known documents and are used to express the most fundamental characteristics of the systems.
We are going to use in this part the guidelines provided by the UserFocus (userfocus.uk) consultant farm. The specific documentation will be provided on the project folder. Here we are going to show only the result of the heuristics.

Summary of results

	Raw score	# Questions	# Answers	Score
Home Page	18	20	20	95%
Task Orientation	36	44	44	91%
Navigation & IA	26	29	29	95%
Forms & Data Entry	19	23	23	91%
Trust & Credibility	12	13	13	96%
Writing & Content Quality	21	23	23	96%
Page Layout & Visual Design	34	38	38	95%
Search	13	20	20	83%
Help, Feedback & Error Tolerance	27	37	37	86%
Overall score		247	247	92%

Fig. 21: Results of the Heuristic analysis

As you can see from the table, the evaluation of the site is very high, 92% .

In the next section we are going to perform User testing.

User Testing

Inspection, is an internal evaluation that takes place inside the design team; now we are going to consider another type of evaluation called User testing. User testing is an external evaluation where real user are part of the evaluation process. There are two types of user testing as we have mentioned before but in this phase of the project we are going to focus on the "Discount Usability Testing", known as the Gorilla testing.
We are going to perform a kind of gorilla testing known as the "Google Usability Caffe". Practically we are going to visit a bar or a cafe' and we are going to ask costumers of the bar to perform some tasks using our application in exchange of a coffee or other products that they would like to take on the bar.
Now the idea is to find random use, of all backgrounds and ask them to perform certain tasks using a new and unknown website for them. We are hoping to get some valuable information and to use it in our design.
In the following pages we are going to specify the protocol of the Usability testing.

Table 24: Testing protocol

Testing type	Discount Usability Testing
Testing methodology	Think aloud
Test manager	Eduart U. and Sheila M.
Number of tests	6
Date	8 June 2018
Number of subjects	6
Location	Cafe' in the center of Bologna
Budget	20 €
List of tasks to be tested	Task 1: **Find the closest shop near your home and fix an appointment using the website interface.** Task 2: **Perform an online hearing test.** Task 3: **Search for general information regarding the hearing health.** Task 4: **Go to the site and look for information regarding new devices and their characteristics.**
Subjects and justification	Subject 1: Francesco, 37, security guard Subject 2: Francesco, 30, porter Subject 3: Caterina 26, student Subject 4: Sebastian 26, student Subject 5: Maurizio 54, barman Subject 6: Valentina 46, engineer
Description of the expected results	We are going to use the EEE metrics to evaluate the test. First we are going to consider the Effectiveness and the Efficiency and second the Satisfaction. In the case of Satisfaction we are going to use the System Usability Scale (SUS).
Test organization	Is divided in 4 parts: 1. Presentation to the user 2. Preparation of the user 3. Execution of the test 4. Evaluation of the results

Test number 1: Francesco (Total time employed ~ 15 minutes)

Name	Francesco
Gender	Male
Age	37
Internet usage per day	2 h
What you do for living?	Security Guard
Which sites you visit most?	Youtube
Task 1: Find the closest shop near your home and fix an appointment using the website interface.	The subject doesn't seems to have problems. He located immediately the button "Trova Negozio" on the main menu and then clicked to the map that showed the shops near his gps location. The duration of this task was approximately 2 minutes. The task was concluded without any particular problem.
Task 2: Perform an online hearing test.	It was very easy for the subject to find the right button on the main menu, click on it and then on new page to click the button start test and to follow the steps. The duration of the test was approximately 50 seconds.
Task 3: Search for general information regarding the hearing health.	This task seems to be difficult for the subject. He cannot find the right path to complete the task. First he clicked to the button that lead to the page of the hearing devices, and then to the "Product Gallery" and then back to the Homepage. After that wasted some time around the Homepage, finally he located the button "Hearing Loss", and from that point I declared the task finished. The duration of the task more than 3 minutes.
Task 4: Go to the site and look for information regarding new devices and their characteristics.	Very quick completion of the task. The subject found directly the right button and on the new page and opened the "Product Gallery". The duration of the test was around 1 minute.
Homepage notes: (do you like the organization of the homepage).	- Create a button or a section called "Family discounts". - Create a button called "Information" and placed it at the top of the page in a very visible place, accessible at the first sight.

Product gallery notes: (what you think about the product gallery).	One of the big images should be a link to the “Product Gallery”, called “Know our products”.
Any suggestion to improve the website?	- The three images on the Homepage should be smaller. - A phone number should be added in the main page, near the “Direct Chat” link. - The new button to be added called “Information” should include the button “Book Now”.
What you think about the entire website?	Yes, nice experience
Place and date of the test	Bologna (Lab. Ercolani), 7 June 2018

Evaluation table for the first test (Francesco).

	Success	Time	Errors	Efficiency	Learnability
Task 1	Yes	2’	No problem, the task was immediately done.	High	Medium
Task 2	Yes	50’’	The task was completed very fast.	High	High
Task 3	Yes	3’	Some difficulties to find the right path. The subject seems confused and at the first glance do not know what to do or which button to click or where to see. After a little he found out the right path.	Low	Medium
Task 4	Yes	1’	No problems at all, the subject found the right path for the completion of the task very quickly and easy.	High	Medium

Test number 2: Francesco (Total time employed ~ 20 minutes)

Name	Francesco
Gender	Male
Age	30
Internet usage per day	8 h
What you do for living?	Porter
Which sites you visit most?	Amazon, Facebook, Decathlon
Task 1: Find the closest shop near your home and fix an appointment using the website interface.	The task was easy to finalize for the subject. He clicked the button "Find a Store" and from then one it was easy to click on the map. It took 2 minutes for the completion of the task.
Task 2: Perform an online hearing test.	The task was not easy for the subject. At the first step he clicked the one of the images at the top of the Homepage and later the button "Hearing Loss". As you can see this is not the correct path, at the least for the original design. After some time the subject made it to find the right button and to go to the right page and perform the test. One of the suggestion of of the subject at this phase was to put the "Hearing Test" in a more visible place. The duration of the test was around 4 minutes.
Task 3: Search for general information regarding the hearing health.	The subject found immediately the the right button "Hearing Loss" and from there followed the information pages. The task was completed in 1 minute
Task 4: Go to the site and look for information regarding new devices and their characteristics.	After some time (5 minutes) the subject managed to complete the task. He suggested that at product page the button "Book Now" has to be called "Book Now Charge Free Visit".
Homepage notes: (do you like the organization of the homepage).	- No registration needed - The Blog should be in the top of the page not at the bottom of it. - The button "Find Shop" should not be in the main menu.
Product gallery notes: (what you think about the product gallery).	OK, nothing to change

Any suggestion to improve the website?	Move the "Hearing Test" button near the website logo.
What you think about the entire website?	Yes, good
Place and date of the test	Bologna (Letters Faculty), 7 June 2018

Evaluation table for the second test (Francesco).

	Success	Time	Errors	Efficiency	Learnability
Task 1	Yes	2'	The subject found directly the right path. The subject competed the task	High	High
Task 2	Yes	4'	The task was not easy to complete for the subject. The task was completed at the end after a lot of time.	Low	Medium
Task 3	Yes	1'	Easy to complete, no difficulties at all.	Medium	Medium
Task 4	Yes	5'	The subject spend time around the site don't knowing where to go at the first, later on he fix the right path. The task was completed.	Low	Medium

Test number 3: Caterina (Total time employed ~ 20 minutes)

Name	Caterina
Gender	Female
Age	26
Internet usage per day	4 h
What you do for living?	Student
Which sites you visit most?	University related websites, Youtube
Task 1: Find the closest shop near your home and fix an appointment using the website interface.	The task was executed very rapidly. The subject saw immediately the right button, "Find Shop" and clicked it and map. At this point the subject had some suggestions for the design team: - No CAP needed, better to use the address where the user lives. - Move the map in the center of the page instead of the right side of the page. The total time for the completion was 1 minute.
Task 2: Perform an online hearing test.	The subject had no problems to find the right path at the first. She located the button and started the test. The total time of the task was less than 1 minute.
Task 3: Search for general information regarding the hearing health.	The subject didn't find the right path at the first time, because she went to the wrong page by clicking the wrong button, "Hearing Devices", then on the second try she fixed out that this kind of information should be under the button "Hearing Loss". At this point the subject finished the task that took 2 minutes.
Task 4: Go to the site and look for information regarding new devices and their characteristics.	The subject found the right path immediately. She said that should be better a more explicit division of the products and their categories.
Homepage notes: (do you like the organization of the homepage).	- The subject suggested that the main menu has to many buttons on it and a better way should be found to manage that space and make it more pleasant and aesthetic. - the "Online Chat" link should be move in a lower level of the Homepage. - No registration or login is needed for this kind of sites.

Product gallery notes: (what you think about the product gallery).	OK
Graphical notes: (what you think about the design and the graphic of the page).	The logo on should be bigger.
Content notes: (what you think about the content of the page)	- More general information at the introduction of each article. - Change the section "News" in the italian version with the name "Per saperne di piu"
Any suggestion to improve the website?	Adapt it for other devices, phones, tablets etc.
Place and date of the test	Bologna (Letters Faculty), 7 June 2018

Evaluation table for the third test (Caterina).

	Success	Time	Errors	Efficiency	Learnability
Task 1	Yes	1'	The subject found directly the right path. The subject competed the task	High	High
Task 2	Yes	1'	The task was not easy to complete for the subject. The task was completed at the end after a lot of time.	Low	Medium
Task 3	Yes	2'	Easy to complete, no difficulties at all.	Medium	Medium
Task 4	Yes	40''	The subject spend time around the site don't knowing where to go at the first, later on he fix the right path. The task was completed.	Low	Medium

Test number 4: Sebastian (Total time employed ~ 25 minutes)

Name	Sebastian
Gender	Male
Age	24
Internet usage per day	7 h
What you do for living?	Student
Which sites you visit most?	Youtube, Reddit, Monoscope
Task 1: Find the closest shop near your home and fix an appointment using the website interface.	The task was immediate, the subject found directly the right path. It took approximately 1 minute to complete the task.
Task 2: Perform an online hearing test.	Even this task was immediate for the subject. The whole completion of the task took 1.5 minutes.
Task 3: Search for general information regarding the hearing health.	The subject think a little, look around the site and then clicks the button “Hearing Loss”. At this point he views the information presented on the site. The subject suggested that maybe is better to include a print option on the news. The duration of the task was around 2 minutes.
Task 4: Go to the site and look for information regarding new devices and their characteristics.	This task was immediate for the subject. He found immediately the right path. The subject suggested to change the name of the category “Amplifiers and other Accessories” to something more appropriate that express better the distinction between the hearing devices and the other accessories. The subject suggested that more images and video have to be included on the Assistance section.
Homepage notes: (do you like the organization of the homepage).	- The image of the logo should be bigger - Insert a phone number close to the “Direct Chat” link. - Registration if is strictly necessary.
Content notes: (what you think about the content of the page).	- Basic information are ok - Advice good - Keep cleaner the division between the products in the product gallery.
Graphical notes: (what you think about the design and the graphic of the page).	- The logo should be bigger - The website name should be more indicative.

Product gallery notes: (what you think about the product gallery).	OK
Place and date of the test	Bologna (Letters Faculty), 7 June 2018

Evaluation table for the forth test (Sebastian).

	Success	Time	Errors	Efficiency	Learnability
Task 1	Yes	1'	No problems at all the task was completed at the first.	High	High
Task 2	Yes	1' 50''	The task was not easy to complete for the subject. The task was completed at the end after a lot of time.	Medium	Medium
Task 3	Yes	2'	The subject spend some time thinking what to do and then found the right path to the execution of the task.	Medium	High
Task 4	Yes	3'	Completed immediately by the subject. No problems were	High	Medium

Test number 5: Maurizio (Total time employed ~ 10 minutes)

Name	Maurizio
Gender	Male
Age	54
Internet usage per day	1 h
What you do for living?	Bartender
Which sites you visit most?	Youtube, Gazzetta,
Task 1: Find the closest shop near your home and fix an appointment using the website interface.	Easy, the subject found immediately the right path. The task lasted 2 minutes.
Task 2: Perform an online hearing test.	It took more time and one erroneous step by the subject. First the user clicked the image "Know your Hearing" then after a while he realized that the right button was "Hearing Test" and from then on was easy to complete the task. The duration of the task was around 3 minutes.
Task 3: Search for general information regarding the hearing health.	It took more time, because the subject was not sure where to click so he was looking around the website. At the end the subject clicked the button "Hearing Loss" and from there on it was easy for him to find the needed information. The task lasted approximately 5 minutes.
Task 4: Go to the site and look for information regarding new devices and their characteristics.	This task was also difficult to complete for the subject. The subject had a hard time to fix out where to click and where do go to find the information needed. At the end he managed to get to the product gallery and to see the products and their characteristics.
Homepage notes: (do you like the organization of the homepage).	OK, nothing to change
Content notes: (what you think about the content of the page).	OK, nothing to change
Graphical notes: (what you think about the design and the graphic of the page).	OK, nothing to add or to change
Place and date of the test	Bologna (Bar Aristo), 8 June 2018

Evaluation table for the fifth test (Maurizio).

	Success	Time	Errors	Efficiency	Learnability
Task 1	Yes	2’	The subject had no problem to complete the task in little time.	Medium	Medium
Task 2	Yes	3’	The subject made a first error and then had a hard time to find the right path but eventually he finished the task.	Low	Medium
Task 3	Yes	5’	The subject had some problems to decide where to go and where to click.	Low	Low
Task 4	Yes	3’	This task was also problematic for the subject. He had trouble to find the right path. Eventually he completed the task.	Low	Medium

Test number 5: Valentina (Total time employed ~ 10 minutes)

Name	Valentina
Gender	Female
Age	46
Internet usage per day	2 h
What you do for living?	Engineer
Which sites you visit most?	Corriere/Reppublica, Comune Bologna
Task 1: Find the closest shop near your home and fix an appointment using the website interface.	It was easy for the subject to find the right button to click and to in the new page she selected the option to insert the CAP instead of the map. It took her 2 minutes to complete the task.
Task 2: Perform an online hearing test.	The subject had no problem to find the right way to complete the task. She clicked the button "Hearing Test" and from there the "Start Test" button. One suggestion was to enable the image at the top of the page as the "Start Test" button. The duration of the task was about 3 minutes.
Task 3: Search for general information regarding the hearing health.	The subject clicked immediately the button "Hearing Loss" and completed the task in 1 minute.
Task 4: Go to the site and look for information regarding new devices and their characteristics.	Here the subject had a little trouble to find the correct page. Once she find the right page she had a little problem to fix out why the division of the section was that way. She complained that should be more clear the division of the products. Another suggestion was that the number of pictures on the product gallery was very big and there should be less and maybe arranged in a kind of a scrolling menu. The task was finished in 4 minutes.
Homepage notes: (do you like the organization of the homepage).	The subject suggest to take out the 3 top pictures and instead of this pictures to create a vertical menu located on the left of the Homepage. The logo should be bigger and more visible on the Homepage.
Graphical notes: (what you think about the design and the graphic of the page).	OK
Place and date of the test	Bologna (Caffe sette chiese), 8 June 2018

Evaluation table for the fifth test (Valentina).

	Success	Time	Errors	Efficiency	Learnability
Task 1	Yes	2’	No problems for the subject to complete the task in a reasonable time.	Medium	Medium
Task 2	Yes	3’	The task was easy to perform for the subject, no trouble found here.	Medium	Medium
Task 3	Yes	1’	No problem at all. The subject had no problems to finish this task very quick and with the desired result.	High	Medium
Task 4	Yes	4’	The problem has difficulties to find the right path.	Low	Medium

Satisfaction Analysis - SUS

At this point after the User Testing and the Quantitative Evaluation for each test now we have to deal with the Qualitative Evaluation of the tests. As mentioned in the testing protocol we are going to consider the SUS evaluation method.
As a recall SUS is a quantitative measure used to measure the satisfaction of a user when using a system or device. SUS consists of 10 question each of them has a possible value form 1 to 5.
In the following pages we are going to present the SUS of all six subject that we interviewed.

SUS module for Mr. Francesco.

1. I think that I would like to use this website frequently.

1	2	3	4	5

2. I found this website unnecessarily complex.

1	2	3	4	5

3. I thought this website was easy to use.

1	2	3	4	5

4. I think that I would need assistance to be able to use this website.

1	2	3	4	5

5. I found the various functions in this website were well integrated.

1	2	3	4	5

6. I thought there was too much inconsistency in this website.

1	2	3	4	5

7. I would imagine that most people would learn to use this website very quickly.

1	2	3	4	5

8. I found this website very cumbersome/awkward to use.

1	2	3	4	5

9. I felt very confident using this website.

1	2	3	4	5

10. I needed to learn a lot of things before I could get going with this website.

1	2	3	4	5

SUS Evaluation:	62.5

SUS module for Mr. Francesco.

1. I think that I would like to use this website frequently.

1	2	3	4	5

2. I found this website unnecessarily complex.

1	2	3	4	5

3. I thought this website was easy to use.

1	2	3	4	5

4. I think that I would need assistance to be able to use this website.

1	2	3	4	5

5. I found the various functions in this website were well integrated.

1	2	3	4	5

6. I thought there was too much inconsistency in this website.

1	2	3	4	5

7. I would imagine that most people would learn to use this website very quickly.

1	2	3	4	5

8. I found this website very cumbersome/awkward to use.

1	2	3	4	5

9. I felt very confident using this website.

1	2	3	4	5

10. I needed to learn a lot of things before I could get going with this website.

1	2	3	4	5

SUS Evaluation:	75

SUS module for Miss. Caterina.

1. I think that I would like to use this website frequently.

1	2	3	4	5

2. I found this website unnecessarily complex.

1	2	3	4	5

3. I thought this website was easy to use.

1	2	3	4	5

4. I think that I would need assistance to be able to use this website.

1	2	3	4	5

5. I found the various functions in this website were well integrated.

1	2	3	4	5

6. I thought there was too much inconsistency in this website.

1	2	3	4	5

7. I would imagine that most people would learn to use this website very quickly.

1	2	3	4	5

8. I found this website very cumbersome/awkward to use.

1	2	3	4	5

9. I felt very confident using this website.

1	2	3	4	5

10. I needed to learn a lot of things before I could get going with this website.

1	2	3	4	5

SUS Evaluation:	87.5

SUS module for Mr. Sebastian.

1. I think that I would like to use this website frequently.

1	2	3	4	5

2. I found this website unnecessarily complex.

1	2	3	4	5

3. I thought this website was easy to use.

1	2	3	4	5

4. I think that I would need assistance to be able to use this website.

1	2	3	4	5

5. I found the various functions in this website were well integrated.

1	2	3	4	5

6. I thought there was too much inconsistency in this website.

1	2	3	4	5

7. I would imagine that most people would learn to use this website very quickly.

1	2	3	4	5

8. I found this website very cumbersome/awkward to use.

1	2	3	4	5

9. I felt very confident using this website.

1	2	3	4	5

10. I needed to learn a lot of things before I could get going with this website.

1	2	3	4	5

SUS Evaluation:	82.5

SUS module for Mr. Maurizio.

1. I think that I would like to use this website frequently.

1	2	3	4	5

2. I found this website unnecessarily complex.

1	2	3	4	5

3. I thought this website was easy to use.

1	2	3	4	5

4. I think that I would need assistance to be able to use this website.

1	2	3	4	5

5. I found the various functions in this website were well integrated.

1	2	3	4	5

6. I thought there was too much inconsistency in this website.

1	2	3	4	5

7. I would imagine that most people would learn to use this website very quickly.

1	2	3	4	5

8. I found this website very cumbersome/awkward to use.

1	2	3	4	5

9. I felt very confident using this website.

1	2	3	4	5

10. I needed to learn a lot of things before I could get going with this website.

1	2	3	4	5

SUS Evaluation:	72.5

SUS module for Mrs. Valentina

1. I think that I would like to use this website frequently.

1	2	3	4	5

2. I found this website unnecessarily complex.

1	2	3	4	5

3. I thought this website was easy to use.

1	2	3	4	5

4. I think that I would need assistance to be able to use this website.

1	2	3	4	5

5. I found the various functions in this website were well integrated.

1	2	3	4	5

6. I thought there was too much inconsistency in this website.

1	2	3	4	5

7. I would imagine that most people would learn to use this website very quickly.

1	2	3	4	5

8. I found this website very cumbersome/awkward to use.

1	2	3	4	5

9. I felt very confident using this website.

1	2	3	4	5

10. I needed to learn a lot of things before I could get going with this website.

1	2	3	4	5

SUS Evaluation:	80

The following table summarize the SUS evaluation for every test.

Table 25: SUS evaluation

Subject tested	SUS Evaluation
Francesco	80
Francesco	72.5
Caterina	82.5
Sebastian	87.5
Maurizio	75
Valentina	62.5
Valore medio SUS	76.7

Analysis of subjective and objective data

Subjective Analysis.

Here we are considering the comments of the users in a listed form.

“The register/login option is not necessary and can avoided”

“The logo of the company should be bigger and more visible”

“The product gallery should be organized better and the classification of the product should be well defined”

“The main menu bar should be cleaner and with fewer buttons”

“Some buttons can be merge together because are similar”

“Near the online chat button should be inserted a phone number”

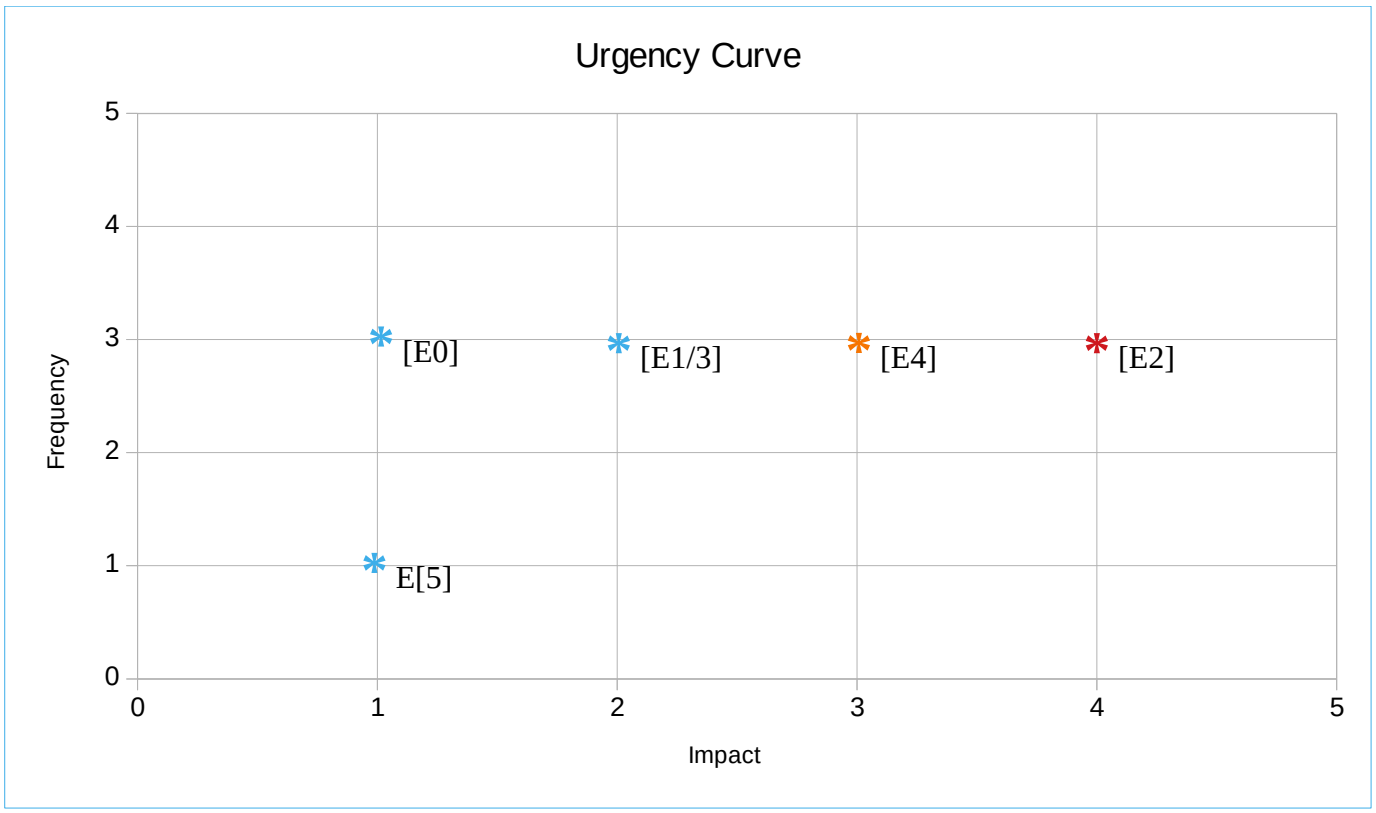
Objective Analysis (error representation).

We are going to put in a table the errors/suggestions found during the testing phase. As previously we are going to name the errors and to give them a value based on two characteristics: Impact and Frequency.
This classification will be more visible in the Urgency Curve.

Table 26: Error Summarization

Error Id	Error Description	Impact	Frequency
E0	The register/login option is not necessary and can avoided	1	3
E1	The logo of the company should be bigger and more visible	2	3
E2	The product gallery should be organized better and the classification of the product should be well defined	4	3
E3	The main menu bar should be cleaner and with fewer buttons	2	3
E4	Some buttons can be merge together because are similar	3	3
E5	Near the online chat button should be inserted a phone number	1	2

Now we are going to show the Urgency Curve. To recall, the Urgency Curve is use as a visual tool to represent the errors and their impact, frequency and other.



* Fix in a future release * Fix in the next iteration of the design process * Fix now

The color scheme used is easy to understand. We use the blue color to represent errors of a soft or aesthetic nature. The orange color represent the

errors that are significant but not very severe. This kind of errors can be fixed in a future release of the system.
The third type of errors, color red represent the very urgent errors that has to be fixed now.

Chapter 6

Conclusions And Recommendations

Objective of this project

The objective of this project is to design a secondary website for a company that produce a broad class of electronic device including hearing devices.
Our goal was to create a new space for the hearing devices and the other devices related with the hearing. We based this proposal on the data we found about the hearing health of the population and the relation between the first one and other characteristics like age, lifestyle, education etc.
We followed all the stages of the goal-based design for the design of our product.

What have we achieved

The final result of our work was the design of a new website for the company. This website has to achieve high scores on the usability and the user experience measures and in the same time be informative a to sell the companies products.
To achieve this goals we made a vast market research and focused on the possible users of the website.
We conduct all the studies and methods offered by the goal-based design and report precisely result on the documentation folder.
We tested our prototype in relation with the most important heuristics and with real users.
The results that we obtained were very informative for the design team in order to rethink some design concept and to redesign based on the users feedback.
At the end we think that the final product have all the characteristic of a ready to use website.

The data and the numbers

The data and the related charts and conclusions are provided on this document and the other document provided in the design folders.
For each experiment we conduct there are tables, charts, number and other data the provide crud and elaborated data.

How to interpret the data?

The data obtained by all the tests and experiments we have conducted are interpreted based on the most important and well-known design methodologies.
We made good use of the goal oriented design and the CAO=S model.
We think that the interpretation of the data we provide should be clear and easy for all kind professional users but have made great effort to adapt this work even to the non professional people.
We have provide most of the data in a clear and well designed table form that is the most used method to represent numbers, data and text.

In some special cases like in the user testing we have made possible to have actual audio of the users performing the test. This for the purposes of the design process only.

What can be improved

In this work we have made all the efforts to create a complete product with all the analysis and studies necessary for an acceptable result. Of course this doesn't exclude the possibilities for further work and improvements. The lifecycle of a software product all kinds of manipulations extensions and other changes. This product allows and encourage all this kinds of changes.
In particular some possible modifications on the website may be:

- The extension of the system in other hardware platforms like mobile devices.
- The extension of the services on the system for personaliation of the products.

Other possible modifications are related with the look and feel of the websites, with the graphical components and dynamic components. This and others may be further exploited by the design team.

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