Project Management Highlights

PARKoUR
Parking Application Usability Redesign

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1. Ethnographic research

Segmentation of the target

Application Target:

- Users of technology;
- Users able to download applications;
- Users able to do online payment.

Among them, we can distinguish:

- Those who use or would use the application for a third party or themselves;
- Those who use or would use the application for a single occasion or frequently.

	Occupation	Living	Income	Technology
< 18	student	with parents	low	oriented
18-30	students, employees with a temporary contract, employees with a permanent contract, unemployed	with parents, with their partner without children, with roommates or alone	low or medium	oriented or sceptic
30-40	employees with a temporary contract, employees with a permanent contract, unemployed	with parents, with their partner without children, with their partner with children, with roommates or alone	low, medium or high income	oriented or sceptic
40-65	employees with a temporary contract, employees with a permanent contract, unemployed	with their partner without children, with their partner with children or alone	low, medium or high income	oriented, sceptic or unable
> 65	employees with a permanent contract, retired	with their partner without children, with their partner with children, with other relatives or alone	low, medium or high income	oriented, sceptic or unable

User research: Survey

- **Survey focus:** all possible users, regarding online payment for parking services.

- **Survey channels:** social media (Whatsapp and Facebook).

- **Survey methods:** personal questions and questions on online payment of parking fees through applications.

- **Results of the survey:** Most users (52) didn't know these applications for online parking payment and for those who knew about, there were three who used MyCicero (the most used). 11 answered they don't trust these apps, they don't like them, they are not interested.

- **Resulting Target:** People living in Italy, ranging from 18 to 30 years, with as occupation: students, unemployed, trainees or workers and are technology oriented or sceptic.

User research: Interview

Interviewed	Our target users
Number of questions	18
Number of interviewed	7
Age	23-30
Profession	Student, unemployed, trainee, worker
Town	Bologna, Prato, Florence, Turin, Forlì
House location	In the city, out of town, in the suburbs
Tool used	Computer and cell phone
Model	Virtual and live
Questions	Background info, technology use, product use, objectives and motivations, pain points

Questions on parking payment	Answers
Do you use an app for parking?	Yes (2) No (5)
If yes, which one(s)?	ATAF, MyCicero
If yes, in which town?	Florence, Cesenatico and Cesena
With which frequency?	Only once
For which occasion ?	For a concert, or summer holidays
Are you still using?	No
Have you used other app?	No
Why you don't use them anymore?	Free parking or pay with machines
Why do/did you use it?	By necessity, or convenience
If no, why would you use?	By necessity, or convenience
If no, what advantages you would expect?	Simple and fast payment method
Did you encounter problems?	No, Yes (no reminder vehicle plate)
Do you feel satisfied?	Not completely (Absence of initial guide)
Which are the problems you would not wish to face during the use of the app?	Insecure or slow payments, bugs in the app
How would you react?	Report it, delete the app or contact them.

User research: Task analysis

Assumptions:
- The user had already installed the application and accesses to it through his/her smartphone,
- He is in an area covered by *MyCicero* service
- He already has an account with a registered car plate
- He is already logged in
- Has the GPS switched on
- He has already registered a card

Tasks:
- On street parking payment,
- Extend the parking session,
- Stop the parking session before the expected end.

Task analysis 1 : On-street parking payment

Context and goal: You just parked in an on street parking and you to want to pay the ticket.

Steps:
- From the homepage you select "Parking and Car Parks",
- From the menu, you select "On-street parking",
- From the current page we have 3 sections: "Maps", "List" and "Recent",
- You select the interested area, through one of the 3 sections,
- From the counter you select the end time for the parking,
- You confirm clicking on "Confirm park beginning",
- You choose the payment option from the floating window which contains: "Recharge", "Active usage-based payment" and "Cancel",
- Then, you back home clicking on "back Home".

Task analysis 2: Extend the parking session

Context and goal: You realize that you cannot be back to the car in time for the end of the parking session and you want to extend it.

Steps:
- From the box on the top of the homepage, you select the orange button "Extend",
- From the counter, you increase/raise the time ,
- You click on the button "Extend parking duration",
- From the new page, you select "back Home",
- On the top of the homepage it appears a box with all the information on the parking and on the modified time.
  -
- **OR**
- From the notification area of the phone, you select "Extend"
- From the new notification, you select "Extend".

Task analysis 3: Stop the parking before the expected end

Context and goal: You come back to the car before the ending of the parking and you want to stop it

Steps:
- From the box on the top of the homepage, you select the red button "Stop",
- You, click on the button "Stop parking session",
- From the new page, you select "back Home",
- You verify it if the box has disappeared.

OR
- From the notification area of the phone, you select "Stop" ,
- From the new notification, you select "Stop".

2. Assessment of existing resources

First inspection of the system

Carried out sequentially:
- Without login;
- With login but without registering a card and a plate number;
- Inserting the plate number.

Each step together and then on our own.

Achieved goals

- **City customization**
  Automatic with GPS, additional services

- **Multiple choice - redundancy**
  To reach the same goal, e.g. on street park choice

- **Management of the parking session**
  Box for on-going parking

- **Wide user base**
  Young users, without credit card, foreigners

First inspection of the system

Key problems of usability

- **Bad design**
  Space management

- **Links design**
  Icons-links

- **Coherence**
  Among different linguistic versions, with and without plate number registered

- **Linguistics**
  Linguistic and typographical errors, Italian words in the English version

- **Meaningful design**
  Colors, icons, table of rates and schedules

- **Wrong match between the expectation of the user and the result**
  Back button

- **Missing guidelines**
  Initial guide

- **Missing customization**
  Profile icon

- **User control and irreversible actions**
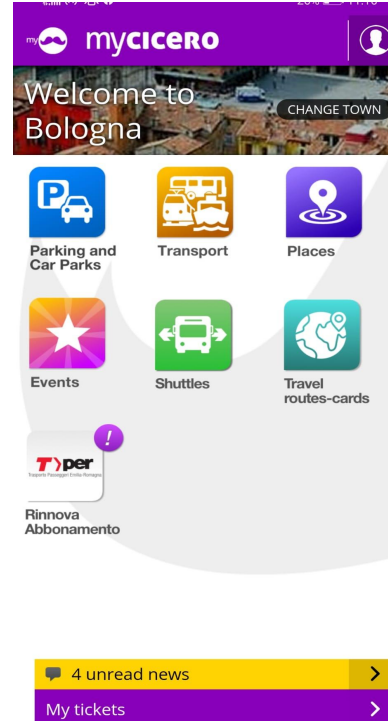 Parking confirmation

Direct analysis: system vs. guidelines

Guidelines: 10 heuristics of Nielsen and Molich and 20 heuristics of Weinschenk and Barker
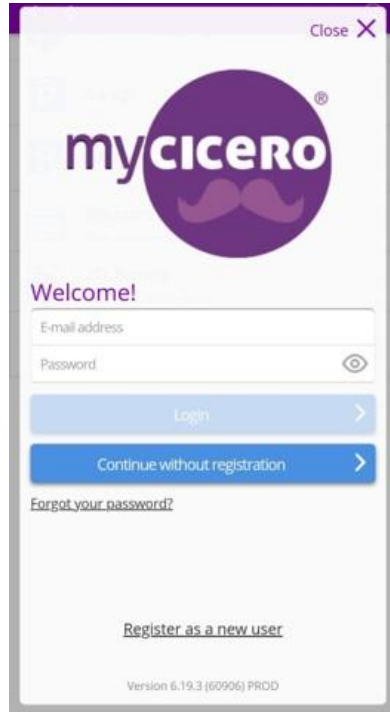
"Continue without registration" takes back to the previous page
8. Predictability

No "Remember me" button or similar
7. Flexibility and efficiency of use
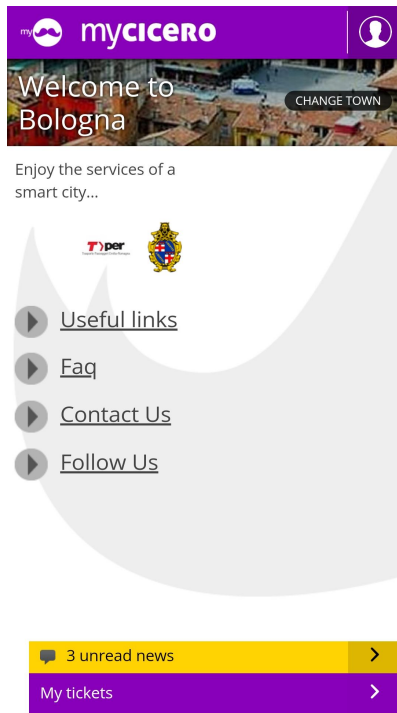
9. Interpretation

Title of the icons half in English and half in Italian
5. Linguistic clarity

No personalized welcome
1. Visibility of system status

Low-quality image not clearly related to the city
14. Cultural property

8. Aesthetics and minimalist design

Direct analysis: system vs. guidelines

Accessible by scrolling right from home
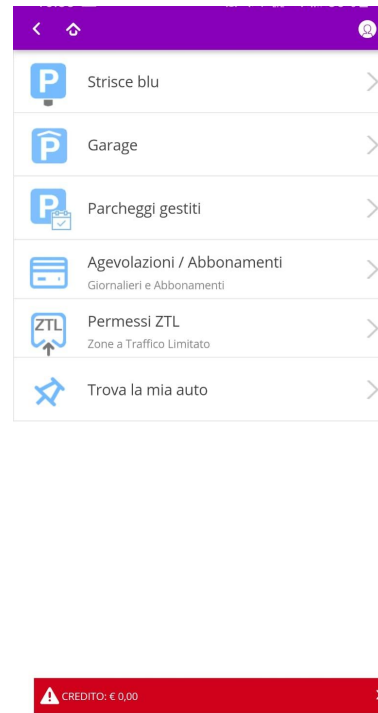**6. Recognition rather than recall**

4. Consistency and standards

In FAQ, less questions in English
4. Consistency and standards

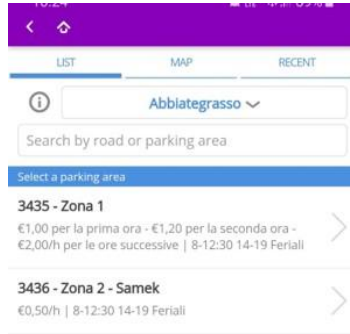FAQs not complete
10. Help and documentation

Not very significant icons
6. Recognition rather than recall

14. Cultural property

Direct analysis: system vs. guidelines

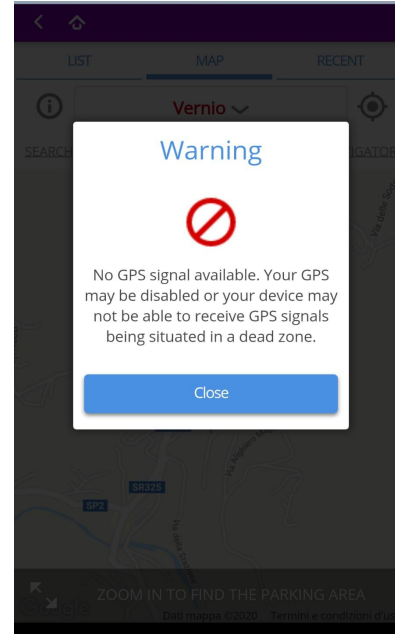Prices are not distinguished from timetables
8. Aesthetics and minimalist design

Numana and Vieste in the list of cities with MyCicero, but if you click not served
4. Consistency and standards

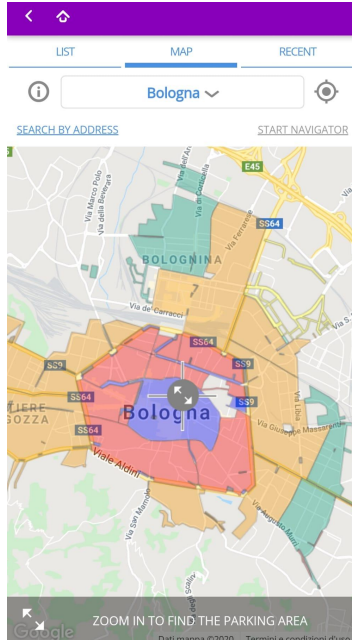3 different pages indicate 3 different prices, not updated
2. Match between the system and the real world

Warning of the GPS cannot be disabled
7. Flexibility and efficiency of use
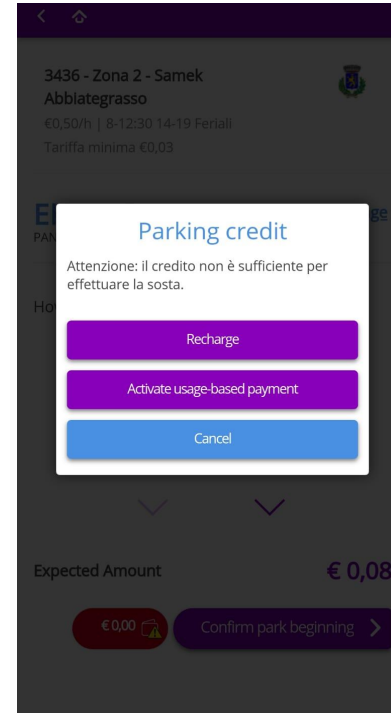
Direct analysis: system vs. guidelines

Not clear links, what they refer to, if they are active

6. Recognition rather than recall

4. Consistency and standards
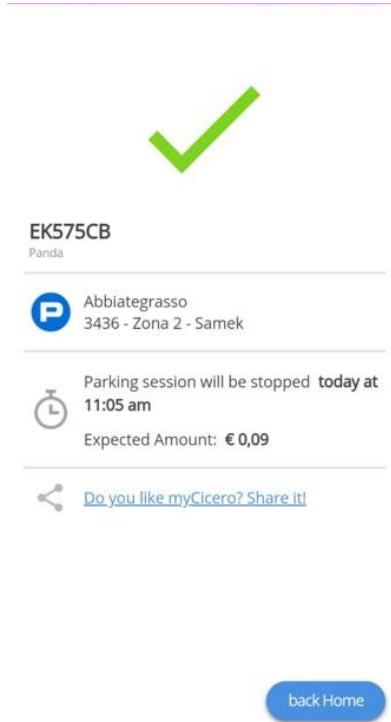
1. Visibility of system status

If no registered credit card, "Activate usage-based payment" button does not appear
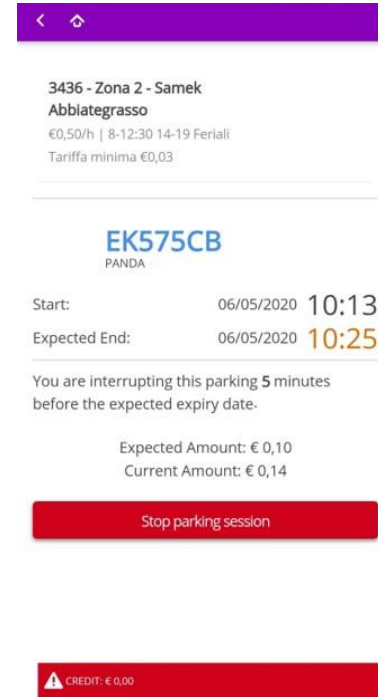
10. Help and documentation

5. Error prevention

Direct analysis: system vs. guidelines

EK575CB
Panda

Abbiategrasso
3436 - Zona 2 - Samek

Parking session will be stopped **today at** 11:05 am

Expected Amount: € 0,09

Do you like myCicero? Share it!

back Home

After clicking on "start parking", no pre-confirmation
5. Error prevention

3. User control and freedom

3436 - Zona 2 - Samek
Abbiategrasso
€0,50/h | 8-12:30 14-19 Feriali
Tariffa minima €0,03

EK575CB
PANDA

Start: 06/05/2020 10:13
Expected End: 06/05/2020 10:25

You are interrupting this parking **5** minutes before the expected expiry date.

Expected Amount: € 0,10
Current Amount: € 0,14

Stop parking session

CREDIT: € 0,00

Difference between what you are told to pay and the actual minimum amount
8. Predictability

10. Help and documentation

Reverse analysis: guidelines vs. system

10 heuristics of Nielsen and Molich

1. Visibility of system status
Current section not understandable,
icon profile disappearing

3. User control and freedom
Back two pages

4. Consistency and standards
Payment time limit in counter's behaviour

5. Error prevention
Not clear if parking time limit present

7. Flexibility and efficiency of use
Patterns logged in and out unclear

8. Aesthetics and minimalist design
Design too much minimal

9. Help users recognize, diagnose and recover from errors
Lack of error messages

10. Help and documentation
Unclear payment time and refund

Reverse analysis: guidelines vs. system

20 heuristics of Weinschenk and Barker

1. User control

Back and home buttons closeness

5. Linguistic clarity

Translation, encoding errors

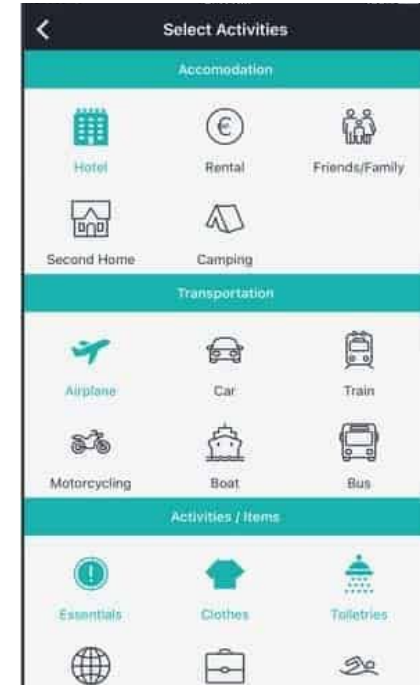**14. Cultural property**

Outdated information

Application ideas

Layout of homepage
and parking section

Musement
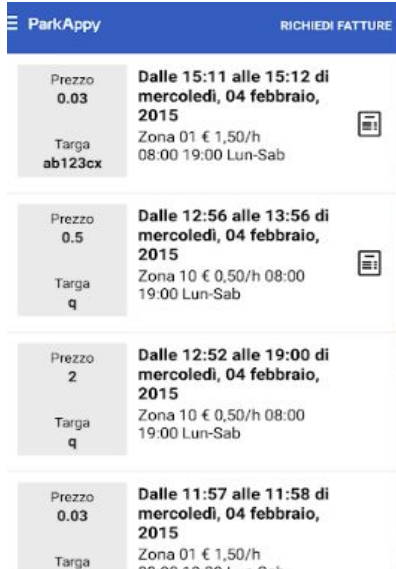**8. Aesthetics and minimalist design**

Parkr
6. Recognition rather than recall
8. Aesthetics and minimalist design

Application ideas

Lists	Layout of the timer	Linguistics

ParkAppy
8. Aesthetics and minimalist design
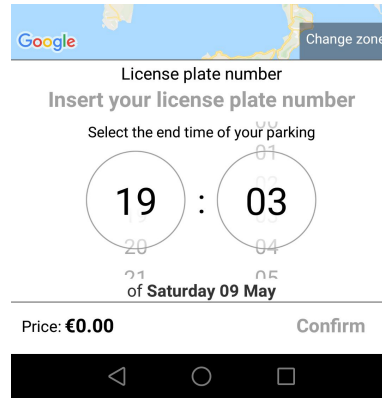
ParkAppy
7. Flexibility and efficiency of use

Parkings
EasyPark
7. Simplicity
5. Linguistic clarity

History
ParkAppy, EasyPark
5. Linguistic clarity
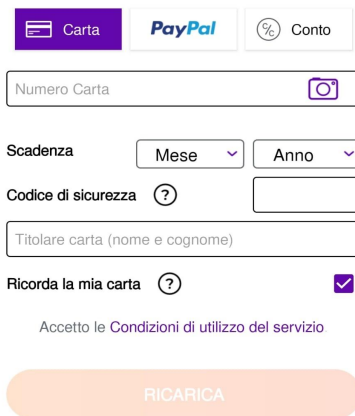
Zone
ParkAppy
5. Linguistic clarity

Application ideas

Payment

Presentation of information	Insertion of data	Confirmation
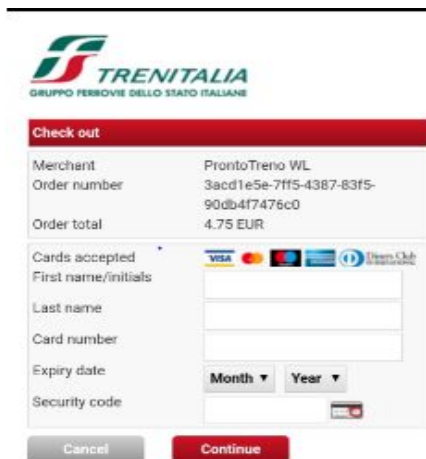
WindTre

8. Aesthetics and minimalist design

4. Consistency and standards

Trenitalia

4. Consistency and standards

8. Aesthetics and minimalist design

Trenitalia

5. Error prevention

3. User control and freedom

1. Visibility of system status

Application ideas

Layout of the profile
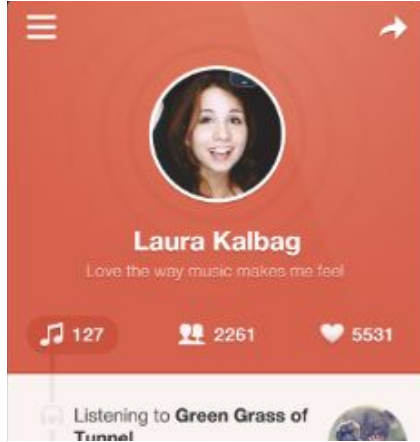
Pinterest
8. Aesthetics and minimalist design

Settings division: *EasyPark*
7. Flexibility and efficiency of use

Logout*: WindTre*
5. Linguistic clarity

Missing initial guidelines
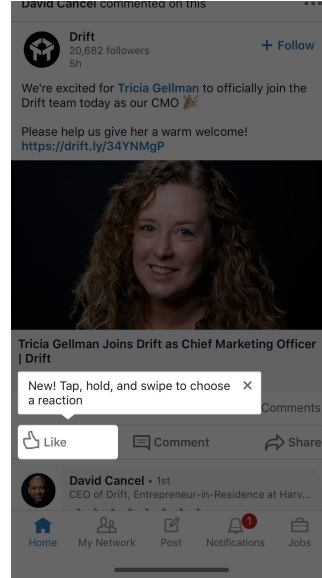
Linkedin
10. Help and documentation
7. Flexibility and efficiency of use

Visibility of the help section

Intesa San Paolo
6. Recognition rather than recall
10. Help and documentation

Usability testing

Protocol

- **Discount usability testing:** formative, vertical testing scope
- **Logistics:** at home, outside or in a room, phone, block notes, app, account and assistant
- **Three tasks:**
  - Create an on-street parking;
  - Extend it;
  - Stop it.
- **Four tests** on four users representative of our target users
- **Testing methodology:** thinking aloud
- **Expected results:** quantitative, qualitative and meaningful interpretation (EEE)

Expected results

- **Success:** the completion of a task with/without help
- **Failure:** abandonment, moderator's interruption, wrong answer (to be evaluated if it's related to the user or to the system).
- **Errors:** selecting an incorrect option in a menu, performing an incorrect, sequence of actions, not activating fundamental action at the right time or at all,
  Cascading error handling: considerat of ion errors that cause other errors (and ignore the latter ones).
  Repeated errors: we considered them with an increase in severity.
- **Efficiency:** the number of "useless" clicks (not for curiosity) to reach a certain point, starting from the moment in which the user accesses the Homepage.
  Start of the action: from the moment in which the user accesses the Homepage
  Count the actions: "Useless" clicks (not for curiosity).
- **Learnability:** performance for users who have never been exposed to a system.
- **Problems:** a choice that leads the participant off track, an expression of frustration, not noticing something that should have been noticed, a participant saying that a task is completed when it is not;Some text content whose purpose, meaning, and role is misunderstood, perform an action that leads the participant farther away from the completion.

Analysis of objective and subjective data (Quantitative)

First user: A male, a worker with a fixed-term contract, lives with his parents, of average income, lives outside the city, is sceptical towards technology, and is 24 years.

Matteo	Success	Errors	Efficiency	Learnability	Problems
Task 1	No - need of the expert for system's fault	Yes	No	Yes, apart for the final failure	Yes
Task 2	Yes	No	Yes	Yes	Yes, but due to the user's knowledge
Task 3	Yes	No	Yes	Yes	Yes

Analysis of objective and subjective data (Quantitative)

Second user: A female, a worker with an intern contract, lives with her parents, of low income, lives in the suburbs, oriented towards technology, and is 24 years.

Alice	Success	Errors	Efficiency	Learnability	Problems
Task 1	Yes	No	Yes	Yes	Yes
Task 2	Yes	No	Yes	Yes	Yes
Task 3	Yes	No	Yes	Yes	No

Analysis of objective and subjective data (Quantitative)

Third user: A female, a worker with an intern contract, lives with her parents, of low income, lives in the suburbs, oriented towards technology, and is 22 years.

Matilde	Success	Errors	Efficiency	Learnability	Problems
Task 1	Yes	No	Yes	Yes	Yes
Task 2	Yes	No	Yes	Yes	No
Task 3	Yes	No	Yes	Yes	Yes

Analysis of objective and subjective data (Quantitative)

Fourth user: Female, a student, lives with roommates, low income, lives in the suburbs, sceptical, and is 23 years old.

Martina	Success	Errors	Efficiency	Learnability	Problems
Task 1	No - need of the expert for system's fault	Yes	No	No	Yes
Task 2	No - need of the expert due to the user's misunderstanding of the system	Yes	No	No	Yes, but due to the user's misunderstanding of the system
Task 3	Yes	No	Yes	Yes	No

Analysis of objective and subjective data

- **Task one:**
  - **Usability drawbacks:** map colours, expert intervention, parking confirmation, redirection plan
  - **Guidelines:** Nielsen and Molich (6. Recognition rather than recall, 10. Help and documentation,1. Visibility of system status) and Weinschenk And Barker (8. Predictability) respectively.
- **Task two:**
  - **Usability drawbacks:** linguistic clarity issues
  - **Guidelines:** Weinschenk And Barker (5. Linguistic clarity)
- **Task three:**
  - **Usability drawbacks:** linguistic clarity issues
  - **Guidelines:** Weinschenk And Barker (5. Linguistic clarity)

Analysis of objective and subjective data (Qualitative)

- **System Usability Scale:** Final assessment questionnaire

	Matteo	**Alice**	**Matilde**	**Martina**
Overall	22.5	70	55	42.5
Task 1	40	62.5	50	22.5
Task 2	82.5	87.5	82.5	95
Task 3	92.5	97.5	72.5	97.5

Urgency Curve 1

Frequency max = 5

Impact = Nielsen's 5 types of errors: cosmetic, minor, major, catastrophic and implementation.
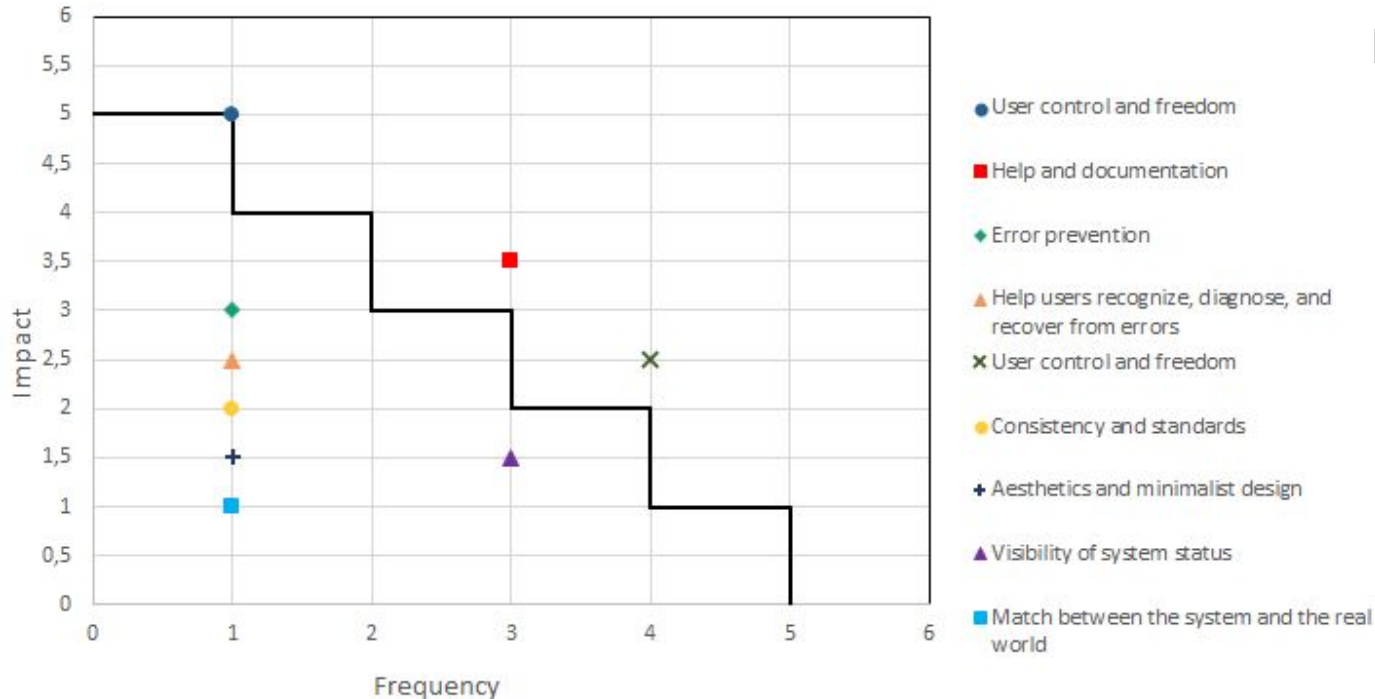
Immediate fix:

- Help and documentation
- User control and freedom

Urgency Curve 2

Frequency max = 5

Impact = Nielsen's 5 types of errors: cosmetic, minor, major, catastrophic and implementation.
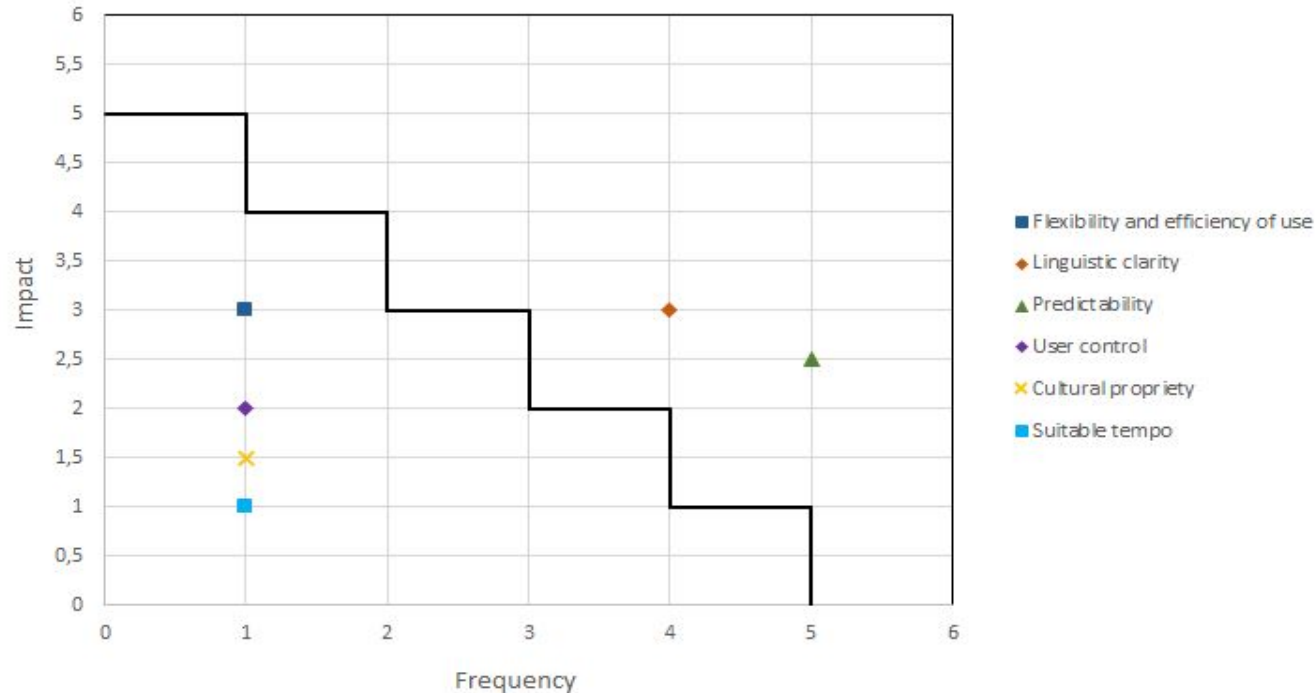
Immediate fix:

- Linguistic clarity
- predictability

Legend:
- ■ Flexibility and efficiency of use
- ◆ Linguistic clarity
- ▲ Predictability
- ◆ User control
- ✕ Cultural propriety
- ■ Suitable tempo

3. Feasibility study

Context of use

- **Intended users are our target user with:**
- availability of a car and drive with frequency,
- parks where MyCicero service is available and
- use the application for themselves.
- **Principals tasks**:
- Make a Parking on the on-street parking,
- Insert the credit card at the moment of the payment,
- Extend it and stop it before the expected end.
- **Constraints:**
- Technicals: Have internet, Mycicero, be logged and where to print the coupon.
- Culturals: know the functioning of the car parks in Italy
- Environmentals: have a car with a car plate be in an area served by MyCicero.

Scenarios (1/3): Luca in a rush

Luca's working contract will expire soon. He decided to take advantage of the situation to change his job, so he sent his CV to many businesses. One of them called him back and set an interview at 11 a.m. today in the city centre of Florence. Unfortunately, it is 10.40 and he is still stuck in traffic. After 10 minutes, he manages to find a car park a few minutes away from the interview building. While he heads over the building in a rush, he opens the app that he is used to park with and in a few steps he pays the parking session with his credit card. This had already been registered in the profile section since he uses so frequently the app. The minutes he saves in paying the parking with the app allow him to arrive at the interview in time.

Scenarios (2/3): Ilaria without coins and card

Ilaria meets for a dinner with her friends. One of them arrives late, blaming the queue at the parking meter. Usually in that zone there aren't this kind of problems, but tonight there is a concert nearby. Inspired by this episode, another friend tells she downloaded and started to use an app for online parking payment and she feels satisfied. The other friends, intrigued, ask her the name of the app and some of them download it. Since Ilaria is sceptical and prefer analog over digital, isn't particularly interested. Two days later, Ilaria is parking to meet with an old friend, but she finds out she doesn't have coins with her and the parking meter doesn't give the possibility to pay with the credit card. She is very worried and thinks back to the app her friends were talking about two days before, whose name she remembers because it resembles to Cicerone. Despite her scepticism, she downloads the app and surprisingly, thanks to the simple introductory guide, she easily manages to pay the parking with her prepaid card.

Scenarios (3/3): Giulia's shopping

Giulia has a free day from work and from the suburbs where she lives and works she decides to go to the city centre of Bologna to look for a pair of shoes that she couldn't find elsewhere. She parks the car along the "Viali", paying with the app for an hour, and goes to a famous shop. Here the saleswoman tells her that the shoes are not available, but she could find them in another store of the chain that is 20 minutes far by feet. Finally, she arrives there and she is able to find the shoes. While she is trying them on, on the phone a notice from the app appears to warn her that the parking is close to expire. Momentaneously gripped by anxiety, while talking with the saleswoman, she extends the parking session in just one step, thanks to the simple interface, for another hour, planning to dedicate more time to shopping after the current purchase. However, once she is out of the shop, she receives an urgent call: one of her roommates is locked outside the flat without keys! For this reason, Giulia comes immediately back to the car. Since the parking session was supposed to be longer, even though she is in a hurry, in just one step, thanks again to the simple interface, she manages to stop the parking session before the expiration, so that she can be refunded for the surplus.

Personas (1/3): Luca

Luca is 27 years old and stopped studying after graduating from a professional hotel establishment. In the following years he had many work experiences on cruise ships, restaurants, tourist villages. In one of his last trips he met Laura, a girl from Florence, with whom he became engaged. So he decides to stop traveling and go home. With the savings that has been put aside over the years, he goes to live for rent in Cerbaia with Laura, who has a degree in Digital Humanities and has been working for a year. He is working in a bar in the center of Florence and has a fixed-term contract which will expire in a month. Luca has understood that he wants to try to enter the world of catering, so he has warned the owners of the bar and is sending curricula to various companies. Luca frequently uses technology, even for things that could be done in analog, to the point that his owner has instructed him to manage the bar's instagram page. Although she goes to work on public transport, she often uses Laura's car in her spare time. For this reason he inquired about the apps that offered him some advantages, even economically as he has to be careful of the expenses, and he discovered the online parking apps, with which he can pay exactly the actual parking time.

Personas (2/3): Ilaria

Ilaria is a 22 year old girl enrolled in the Faculty of Philosophy in Rome. She lives with his parents in the suburbs of Rome and reaches the university by public transport, but often she goes out to the center with his friends and goes by car on the weekend. She has never followed fashions, not even in high school, and has chosen philosophy even though she knows that she may not find work easily. Although she uses the phone and technology and has no difficulty in doing so, she prefers to do things in analog whenever possible and when it comes to paying online Ilaria is skeptical because not seeing who the money goes to makes her think she might be scammed.

Personas (3/3): Giulia

Giulia is 25 years old and originally from Rimini, but has lived in the outskirts of Bologna with roommates since attending university; she recently graduated from the master's degree in Languages and won the call to work for one year in the civil service, teaching Italian to foreigners. Her parents allowed her to bring her grandparents' car to Bologna. She is a dynamic and active girl and always tries to make her day off well. She often uses technology and the internet mainly to keep himself informed about his students' culture and to create material for his work. In addition to this, she likes to use social media to share her day's activities. While inquiring for the civil service on the website of the municipality of Bologna, she came across an advertisement for an online parking app. Being a girl open to novelty, she was intrigued and dumped her. She started using it enthusiastically for his frequent movements.

http://www.comune.bologna.it/news/il-parcheggio-si-paga-con-il-cellulare

4. Design proposal

Information architecture

Information ecology

- **Context:** business
- **Content:** control, format, structure, metadata, volume and dynamicity
- **User:** search for particular and explore for answers
- **Browsing aids and Search aids**
- **Content and task:** headings, text chunks and lists

Top-down approach → each section of the app has its own internal structure different from the others

Bottom-up approach → for the pages of each single section of the app, to standardize the innermost pages between them

Strictly hierarchical structure → the sections are not interconnected with each other as each contains information on a specific area, different from the others

CAO=S model

Concepts

- **Parking:** parking intended as session of parking (hour, price, plate number, payment etc)
- **Park:** parking intended as place where to park (zones, on-street, off-street, garage etc)
- **Account**

We found one problem at the level of the concept of Parking, defined as Polysemy.
To resolve it, we decide to use two different names with specifics meaning: Parking / Park.

Actors (1/4) - Daniele Palazzi
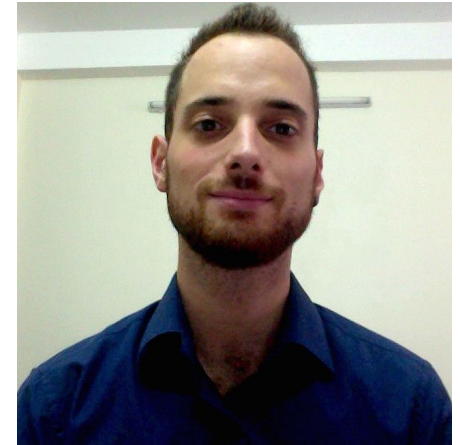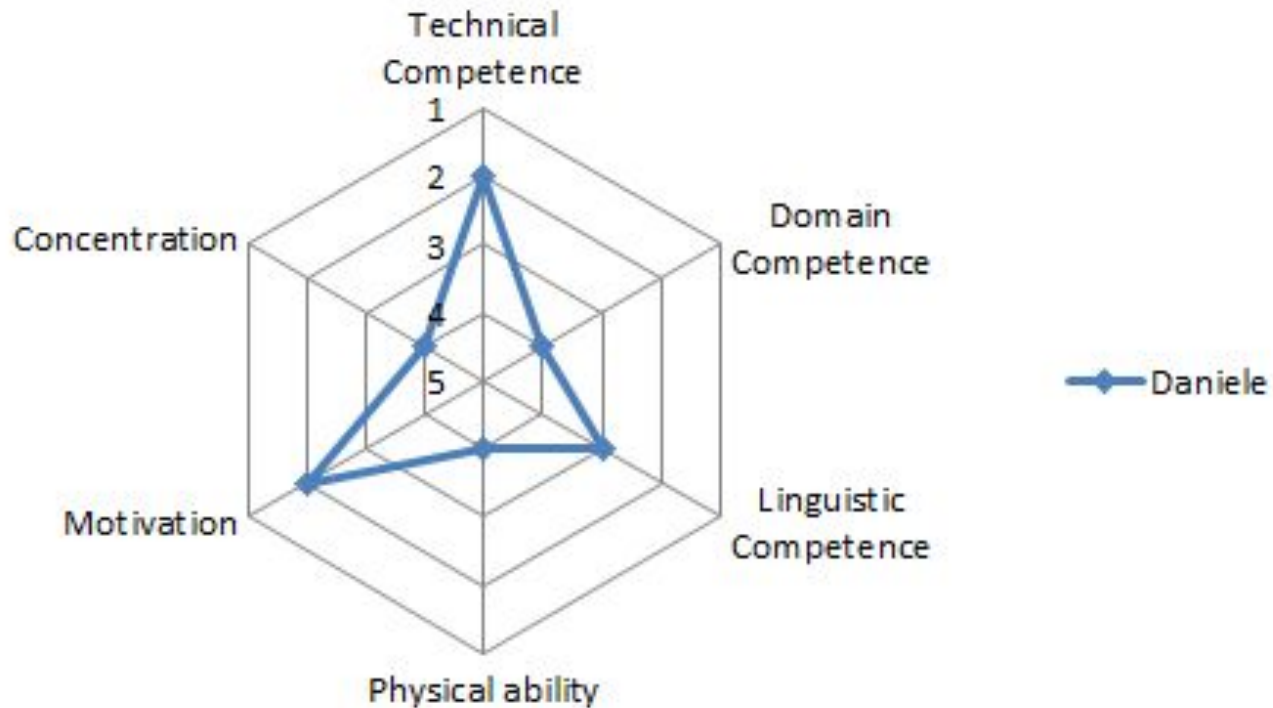
Actors (2/4) - Alex Nkono
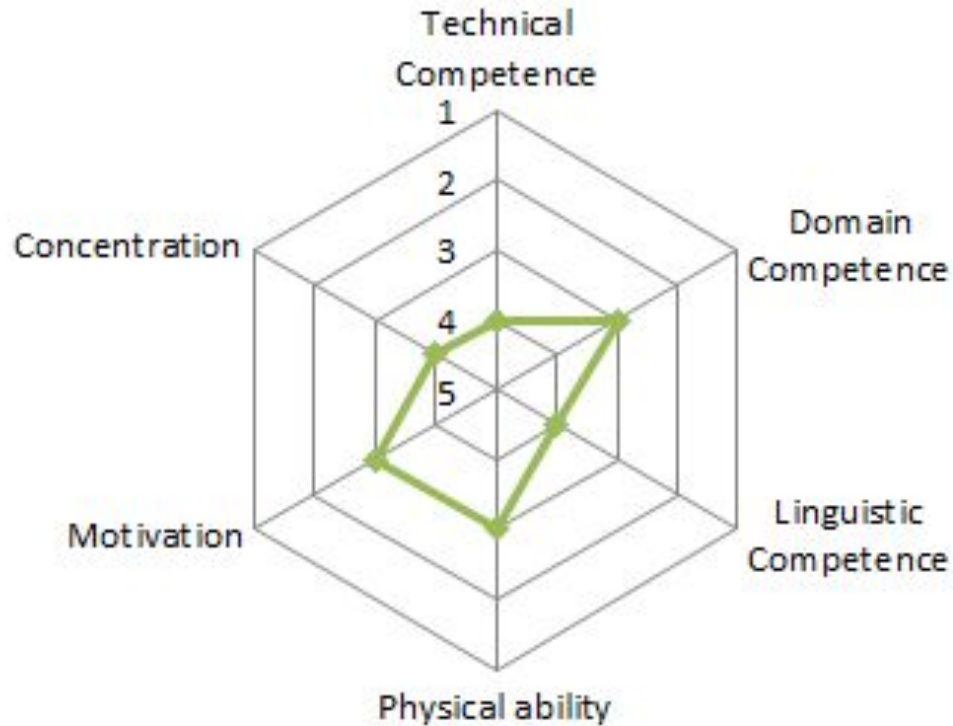
Actors (3/4) - Camilla Palermo

Actors (4/4) - Joseph Kana

Radar chart showing Joseph's ratings across: Technical Competence, Domain Competence, Linguistic Competence, Physical ability, Motivation, Concentration (scale 1–5).
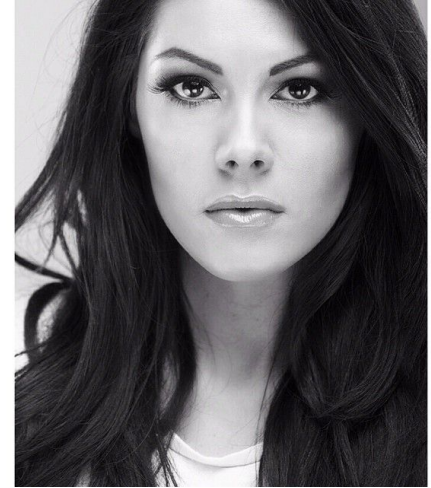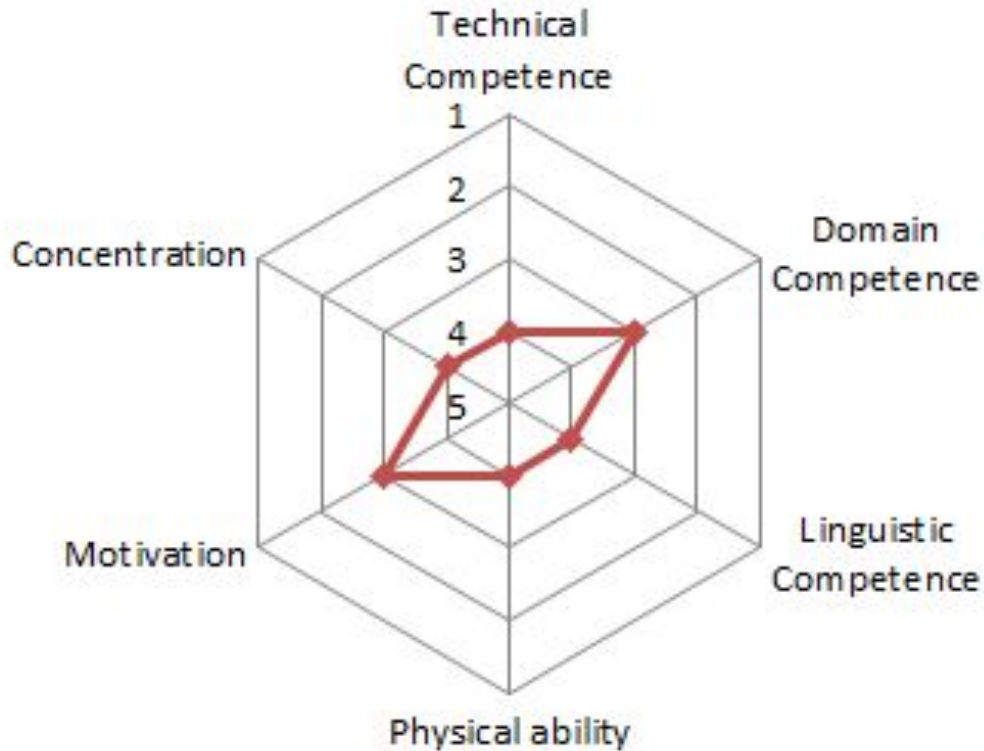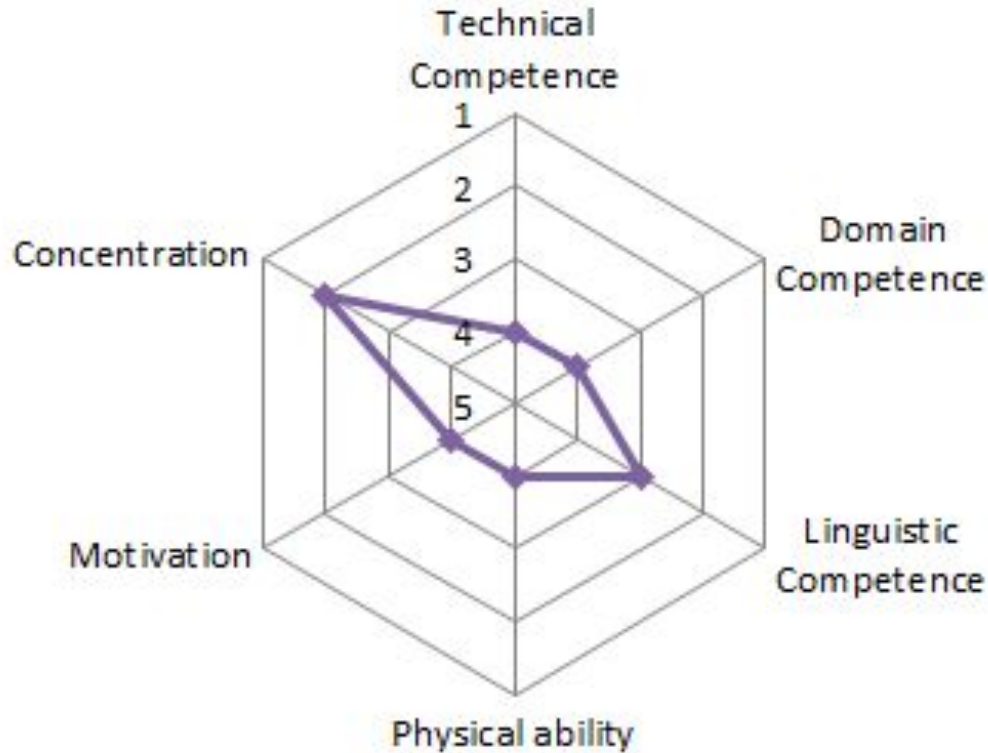
Joseph

Operations (1/3) - **Parking session**

Creation	View	Update	Remove
Park selection Time selection Car plate insertion Payment	Summary of the data before the payment Box on the top of the page	Extension of the parking session, in particular update of the time Change car plate	Stop the parking session Automatic end of the parking session (executing the choice of the user

Operations (2/3) - **Parks**

Creation	View	Update	Remove
	List of parks Map of parks Recents Info on the parks		Deletion of a recent park

Operations (3/3) - **Account**

Creation	View	Update	Remove
Profile creation Insertion of the car plate and, if shared, with whom Insertion of the credit card and, if shared, with whom	Summary of personal data Summary of credit cards: credit cards activities; credit cards; shared credit cards Summary of MyCicero credit: credit activities; remaining credit; auto-recharge; recharge Summary of car plates and shared car plates	Changing of personal data; invoicing data and profile photo Changing of profile options Changing of car plate; car plate sharing and with whom Changing the sharing options of the card and with whom	Removal of the car plate and of the sharing options Removal of the credit card and of the sharing options Account deletion

Structures - **Create**

Person who is parking	Parking session	Parks	Account
Create	Single: possibility to select just one park, hour, plate number, payment method, card at a time. Manual: free selection and insertion of the necessary information. Persistent: it lasts beyond the operation. Default: for the park, current position (with GPS switched on); current hour; only plate number inserted or favourite plate number; default or favourite payment method; favourite card or last used; invoicing data if inserted. Constraint: every voice mandatory. Only hours after the current one, valid city and valid card.	No. New instances can't be added by the users.	Manual: free insertion of the necessary information. Persistent: it lasts beyond the operation. Constraint: mandatory fields in the creation of the account (name, surname, email); valid card.

Structures - **View**

Person who is parking	Parking session	Parks	Account
View	<u>Full individual</u>: summary of the parking session data. <u>Multiple</u>: zone selection and payment. <u>Summary</u>: box after the payment.	<u>Full individual</u>: information on the park. <u>Individual reduced</u>: in the selection of the park from the map, a reduced information view appears, which can be expanded. <u>Multiple - lists:</u> history and parks list. <u>Default</u>: in the park selection, if GPS is on, current park.	<u>Full individual</u>: personal data summary and invoicing data. <u>Individual reduced</u>: every other summary is expandible (account settings, cards, plate numbers).

Structures - **Update**

Person who is parking	Parking session	Parks	Account
Update	Global: change plate number. Specific: parking extension limited to the hour. Default: proposed extension starting from 30 minutes after the previously selected hour. Constraint: extension starting from the selected hour.	No, since new instances can't neither be created by the users.	Global: change account data, account settings, plate numbers, cards, sharing settings of plate numbers and cards. Specific: selecting favourite plate number and card. Default: push notifications activated; no favourites; MyCicero credit as payment method. Constraint: valid card and valid city. Minimum credit 5 euros. Mandatory fields in the account data (name, surname, email).

Structures - **Remove**

Person who is parking	Parking session	Parks	Account
Remove	Archival: ended or stopped parking sessions can be found in the movements' list inside the account, while the park goes in the history section. Constraint: parking sessions cannot be deleted from the movements.	Elimination: possibility to delete last parkings from the history.	Elimination: delete plate numbers, cards, shared plate numbers and cards. Delete the account.

Interaction design

General

- **Homepage**: login or Account, Help, Parking, MyCicero credit information, back to exit the app (with confirmation);
- **Help**: FAQs divided in sections, Contacts;
- **Account**: Summary of user data and MyCicero remaining credit, Account settings, MyCicero settings, logout, deleting the account;
- **Purple band**: back, Home, name of the current section, Account, Help;
- **On-street parks**:
  - **Map** (default): current city (default with GPS) / closest city (if current not served) / city from phone info (if GPS off) / Rome (if info absent) / favourite (if selected). Zoom and click. Box with park. Scrollable list of cities served (alphabetical -default- or proximity), search box, Info, current position (active with GPS on), navigator;
  - **List**: same conditions, same boxes, same colors of Map;
  - **History**: parks with dates, delete.

  Click on the park to parking plan.

Interaction design

Parking plan

- **Whole parking session**: step indication, Cancel
- **Parking plan**: minimum fee alert, info on the park, car plate, parking time (default minimum if present, with explanation), expected amount, Proceed;
- **Payment method** (preference selectable in the Account). Expected amount, Proceed.
  - **MyCicero credit** (default): remaining credit, recharge: select amount (fixed, coupon, other), select payment method (card, other), card list (default favourite or last used), add new card;
  - **Card**: same as credit recharge by card, surcharge alert;
  - **Other**.
- **Overview**: park data with Back to step 1, payment data with Back to step 2, Begin parking;
- **Ongoing parking box**: data, extend, stop;
- **Extension**: only time changeable in plan; old amount, new, difference; payment (default method of the current parking); overview; updated notification;
- **Stop**: parking data; old time and new; old amount, new and difference; choice verification.

Blueprint

LEGEND

Component of a page	(white box)
Page	(grey box)
External page	(ellipse)
Access to site	(arrow)
Connection between pages	(line)
Group of connected pages	(dashed box with stacked cells)
Main page	(black box)

Home

Profile — Account — Logout
Account — User data / MyCicero settings
Profile — Login

Help — Contacts / Online assistance / FAQ

Parking — On-street parks — Map / List / History

Navigator
Info
City list — Search city
Search by address or park name — Park — Parking plan

Wireframes

To create the wireframes we used the tool *Balsamiq*.
We designed:
- The homepage;
- Some sample pages for the initial guide, which would be in the final prototype extended for the whole system;
- The account section;
- The help section;
- All pages necessary to carry out the payment of an on-street parking, the extension of the session and the interruption before the end of the expiration.

Moreover, whenever possible, we provided the wireframe with the links to move from one screen to the other.
See "Final Design"

5. Evaluation of the design

Inspection

- **Method:** Cognitive walkthrough
- **Users:** 3
  - Giuseppe is 26-years-old and works in a pizzeria in the center. The closest parking lot is very large and Giuseppe got tired of always having to do the long distance by foot to pay at the parking meter. For this reason, he downloaded MyCicero, which he had heard about from a friend. Last week he made his first parking with the app. He registered and, thanks to the initial guide, he easily completed the task paying with his credit card. Now he wants to use the app for the first time without guides after a week.
  - Marco is 27 years old and is a part-time cashier in a supermarket. During a lunch break, he found a MyCicero coupon in a newspaper and, intrigued, he downloaded the app. The following day, to go to work he takes the car and makes a parking payment fee with MyCicero, which is currently ongoing, recharging the app's credit with the coupon. The courier with supplies arrives late and Marco has to wait for him at work. He therefore realizes that he cannot get back to the car in time, so he makes an extension of the parking lot.
  - Alice is a 21-years-old student. Her father is a company manager and often travels to other cities for work. For this reason, he downloaded the app MyCicero. Given his positive experience, Alice also started using the app. She made a parking lot using the Mycicero credit to go for an exam, but she finished earlier than expected with a beautiful mark. So she can't wait to go partying and wants to stop the parking session earlier than expected.
- **Task:** happy path
- **Prototype:** wireframes

Task 1: Booking an on-street parking
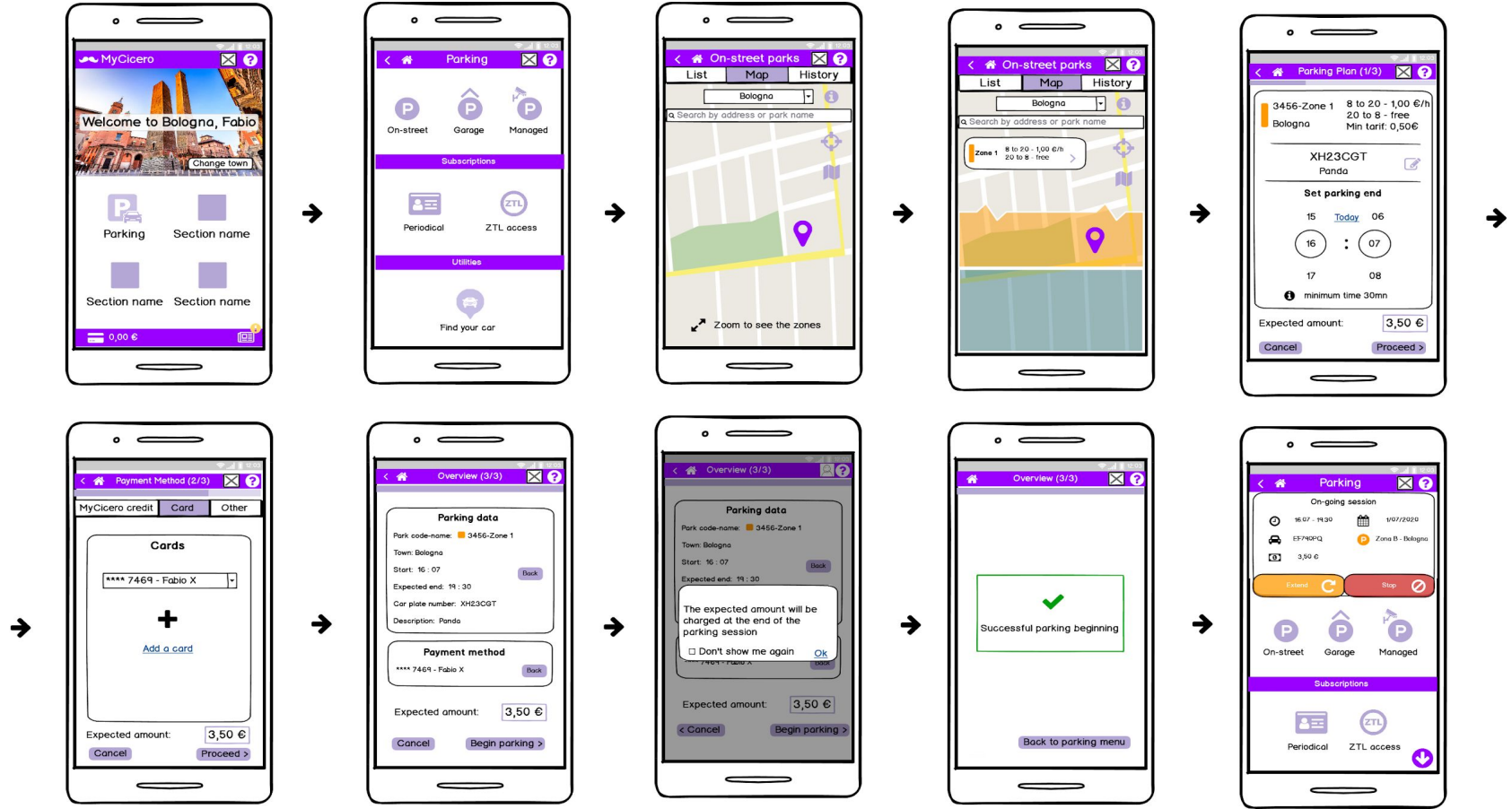
Task 2: Extending an on-street parking
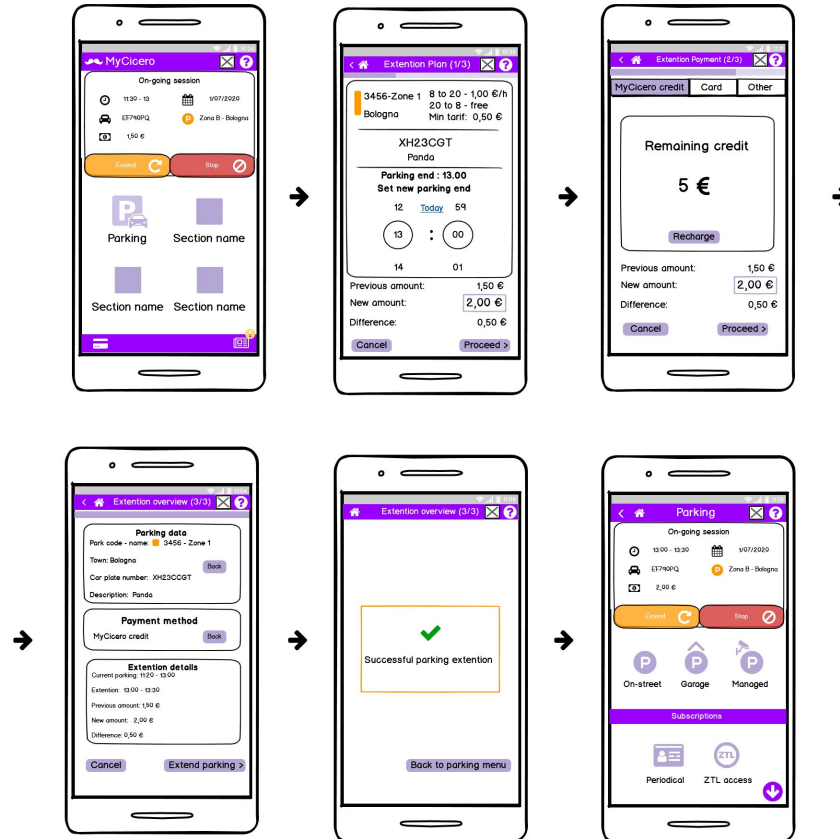
Task 3: Stopping an on-street parking
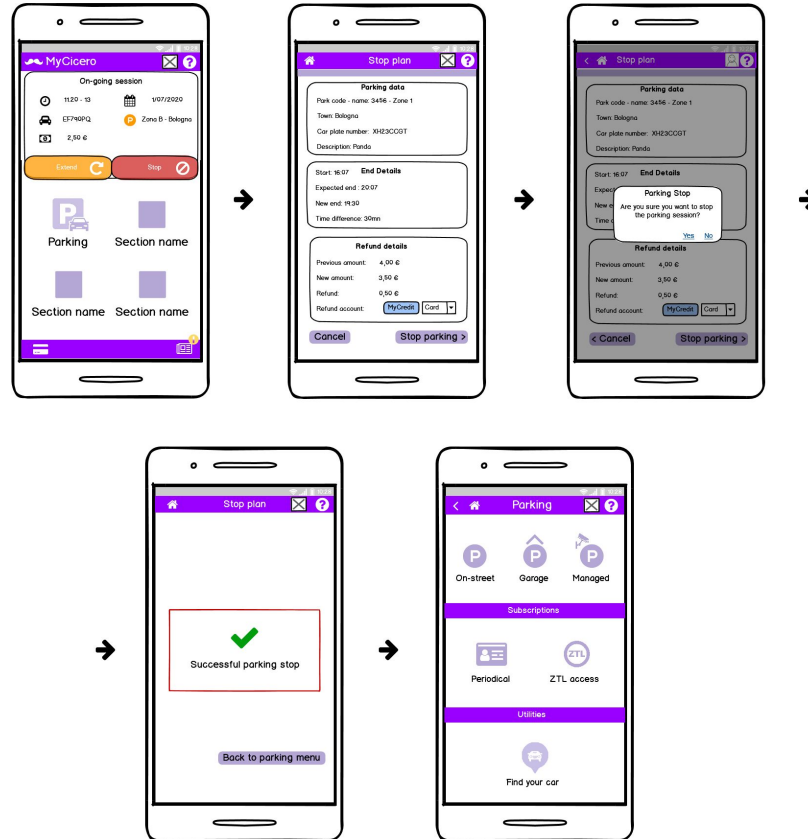
Usability testing
Protocol

- **Discount usability testing:** formative, vertical testing scope
- **Logistics:** at home, outside or in a room, phone, block notes, app, account and assistant
- **Three tasks:**
  - Create an on-street parking;
  - Extend it;
  - Stop it.
- **Four tests** on four users representative of our target users: each test was done progressively after the modifications of the results of the previous test.
- **Testing methodology:** thinking aloud
- **Expected results:** quantitative, qualitative and meaningful interpretation (EEE)

Analysis of objective and subjective data (Quantitative)

First user: a female, worker with a fixed-term contract, lives with roommates, has a middle income, lives in the suburbs, is oriented towards technology, and is 24 years old.

Dani	Success	Errors	Efficiency	Learnability	Problems
Task 1	Yes	No	Yes	Yes	Yes
Task 2	Yes	No	Yes	Yes	Yes
Task 3	Yes	No	Yes	Yes	Yes

Modifications: Initial speech, Content information consistency, Login profile information more evident, Linguistic changes in the details of a parking plan, Confirmation of app exit and Logout confirmation.

Analysis of objective and subjective data (Quantitative)

Second user: a male, 24 years old, is a student, lives with his parents outside the city, has low income, and is technology oriented.

Lorenzo	Success	Errors	Efficiency	Learnability	Problems
Task 1	Yes	No	Yes	Yes	Yes
Task 2	Yes	No	Yes	Yes	Yes
Task 3	Yes	No	Yes	Yes	No

Modifications: Insertion of an alert message for price surcharge with card and Alert message present also for first time use of a card for payment with possibility to close it forever.

Analysis of objective and subjective data (Quantitative)

Third user: a male, is 24-years-old, a student, lives with his parents near the city center, has a low income, and is technology oriented

Federico	Success	Errors	Efficiency	Learnability	Problems
Task 1	Yes	No	Yes	Yes	Yes
Task 2	Yes	No	Yes	Yes	Yes
Task 3	Yes	No	Yes	Yes	No

Modifications: Possibility to see some information for a different zone on the map, Making the arrow button in the box info of the zone on the map page larger, Linguistic clarity on the total amount to pay after a stop and More consistency in layout and information on the overview sections.

Analysis of objective and subjective data (Quantitative)

Fourth user: a female, 24 years old, is a student, lives with her parents outside the city, has a low income, and is sceptical towards technology.

Nicole	Success	Errors	Efficiency	Learnability	Problems
Task 1	Yes	Yes	Yes	Yes	Yes
Task 2	Yes	No	Yes	Yes	No
Task 3	Yes	No	Yes	Yes	No

Modifications: Insertion of an alert infos concerning minimum parking fees when opening a parking plan but the user can select the option not to see it the next time and Making this same information available to the user when the expected amount to pay is less than the set minimum.

Analysis of objective and subjective data (Qualitative)

System Usability Scale: Final assessment questionnaire

	Dani	Lorenzo	Federico	Nicole
Overall	37,5	85	85	92,5
Task 1	52,5	80	77,5	90
Task 2	85	90	85	87,5
Task 3	95	92,5	87,5	90

6. Conclusions and Recommendations

Purpose: redesign of an app for the prepayment of pre-paid parking fees online.

Hypothesis: this kind of applications cannot convince the users because most of the time the payment activity is not very clear and the user could be worried of some some kind of errors during the transaction that could lead to other consequences, such as real-life fines.

Redesign focus: we decided to focus our design of the application on the transparency and the reliability of the procedure.

SUS - before the redesign

	Matteo	Alice	Matilde	Martina
Overall	22.5	70	55	42.5
Task 1	40	62.5	50	22.5
Task 2	82.5	87.5	82.5	95
Task 3	92.5	97.5	72.5	97.5

SUS - after the redesign

	Dani	Lorenzo	Federico	Nicole
Overall	37,5	85	85	92,5
Task 1	52,5	80	77,5	90
Task 2	85	90	85	87,5
Task 3	95	92,5	87,5	90