**Human-Computer Interaction**

Challenge 4 – CA4

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**Outline and competencies C4**

### Graded assignment

| **Start** | **Deadline** | **Grade** | **Time** |
| --- | --- | --- | --- |
| **13/05/25** | **09/06/25** | **23/06/25** | **25h** |

### Have we achieved a better product than the one we initially had? In this last challenge, we will learn to work with tools to compare results and see what improvements or improvement proposals we have achieved.

### Related competencies and Learning outcomes

| **Related competencies** | **Learning outcomes** |
| --- | --- |
| **Collaborate in a virtual team environment.** | * Document the work done. * Propose different proposals for improvement to the problems detected with classmates. * Provide results in a careful way that is understood by both a specialized and non-specialized audience. |
| **Analyze, conceptualize, design and evaluate interaction processes and their interfaces in the field of HCI.** | * Evaluate the interaction process on the platform. * Evaluate the usability of the platform. * Reflect on the interaction with the platform. |
| **Summarize, interpret, present and critically contrast the results obtained using the most appropriate analysis and visualization tools.** | * Synthesize the problems obtained from the user testing and the flow diagrams. * Interpret the results of the user testing. * Connect and use the resulting data to make innovative proposals. |

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## **Case Study**

## 📱🚍 Accessible Public Transport Apps 🌍♿

Nowadays, mobile public transport applications are key tools for planning routes, checking schedules, and ensuring efficient mobility. Examples like **Moovit, Citymapper, and Google Maps** allow millions of users to find real-time transport options. However, for people with **visual or motor disabilities**, these applications present challenges regarding **accessibility, usability, and customization**.

Some of the most common difficulties include the **lack of customizable options in the interface, unclear information about accessible routes, and intrusive notifications**. These barriers limit user confidence and experience when interacting with these applications, reducing their effectiveness and accessibility.

**How can we optimize the user experience in public transport applications to make them more inclusive, accessible, and valuable for people with visual or motor disabilities?**

To address the challenges posed throughout the semester, you must use the provided application examples, as they are specifically designed for this type of service. **You must work only with the examples from this case study, as PECs based on other examples or cases will not be accepted.** Below are examples of public transport applications:

* **Moovit**: A platform that allows users to plan public transport routes.  
  **URL**: [https://moovitapp.com](https://moovitapp.com/)  
  **Free version**: It includes essential features such as route planning and real-time schedules.
* **Citymapper**: Provides detailed multimodal route information with advanced options for public transport, cycling, and walking.  
  **URL**: [https://citymapper.com](https://citymapper.com/)  
  **Free version**: Yes, it includes interactive maps and basic planning options.
* **Google Maps**: A tool with public transport information, directions, and interactive maps.  
  **URL**: [https://maps.google.com](https://maps.google.com/)  
  **Free version**: It includes access to all main features.

### Project Development

Throughout the semester, the mentioned applications will be analyzed, and you will develop your **inclusive public transport application prototype**, applying **Human-Computer Interaction (HCI), User-Centered Design (UCD), and Universal Design (UD) principles**. To effectively achieve this, consider the following **five requirements**:

1. **Interface Customization**: Allow accessibility adjustments such as **high-contrast mode, screen reader support, and text size adjustments** to enhance the experience for low-vision users.
2. **Accessible Route Planning**: Implement filters that prioritize **routes with accessible features**, such as **functional elevators and ramps**, while avoiding **paths that include stairs**.
3. **Interactive Navigation**: Provide **step-by-step navigation with multimodal options (visual, auditory, and haptic)** adapted to each user's capabilities.
4. **Configurable Alerts**: Offer **customizable notifications** to alert users about **route changes, out-of-service access points, and other relevant incidents** tailored to individual preferences.
5. **User Feedback**: Include a feature that allows users to **evaluate route accessibility and generate reports** that can be shared with authorities or developers for future improvements.

With these requirements in mind, your **accessible public transport application prototype** aims to **overcome the most common barriers** faced by users, particularly those with **accessibility needs**, when interacting with these platforms. By applying **Human-Computer Interaction (HCI) principles**, the goal is to create an **optimized user experience** that ensures an **intuitive, efficient, and inclusive** design, facilitating **mobility and autonomy** for all users.

## **Introduction for the assignment C4**

📍 EVALUATION

In this challenge, we focus on: comprehensively **evaluating** the prototype to verify improvements in both quantitative and qualitative aspects, conducting **user tests** to gather direct feedback on the prototype, analyzing the **usability** of a **peer's** **proposal** to gain new perspectives, assessing the **accessibility** of the proposal, and finally, writing a **final report** that documents the findings and progress achieved.

**1. User Testing**

[**User testing**](https://human-computer-interaction.aula.uoc.edu/user-testing/), as we have discussed, provides an understanding of user needs and behaviors. Through this evaluation, **usability**issues are identified, allowing for adjustments that significantly improve the user experience.

💡 Consult the [**User testing Guide**](https://human-computer-interaction.aula.uoc.edu/guia/user-testing-guide/)**.**

💡 Example of [**User Testing**](https://aula.uoc.edu/courses/50236/files/6247734?wrap=1)

**2. Usability of a Peer's Proposal**

[**Usability.**](https://www.nngroup.com/articles/usability-101-introduction-to-usability/)is the measure of how easily and efficiently users can use a product or system to achieve their goals. A usable design enhances the user experience by reducing the learning curve, increasing efficiency and satisfaction, and decreasing errors. Evaluating usability involves examining and measuring how well users can interact, in our case, with the prototype developed in the course, focusing on efficiency, effectiveness, and overall satisfaction in use.

💡 Check out the **ten (10)**[**heuristicsLinks to an external site.**](https://www.nngroup.com/articles/ten-usability-heuristics/)**of Jacob Nielsen** for applying [usability evaluation](https://human-computer-interaction.aula.uoc.edu/heuristic-evaluation/).

💡 Example of [**Usability Evaluation**](https://aula.uoc.edu/courses/50236/files/6247731?wrap=1)

**3. Evaluating the Accessibility of Our Proposal**

Accessibility is an essential approach that ensures that products and services are usable by the widest variety of people, regardless of their physical or cognitive abilities. This philosophy is based on four fundamental principles:

* [**Perceptibility:**](https://www.w3.org/WAI/WCAG22/quickref/?versions=2.1&showtechniques=111) Refers to the ease with which users can perceive information. This implies that content must be presented in such a way that it can be perceived by everyone, regardless of their sensory abilities.
* [**Operability:**](https://www.w3.org/WAI/WCAG22/quickref/?versions=2.1&showtechniques=111&currentsidebar=%23col_overview#principle2) Ensures that all users can operate the interface and controls. This includes considerations such as keyboard navigation and compatibility with assistive technologies.
* [**Understandability:**](https://www.w3.org/WAI/WCAG22/quickref/?versions=2.1&showtechniques=111&currentsidebar=%23col_overview#principle3) Implies that both the information and the operation of the interface must be clear and comprehensible. This means that users must be able to understand the information, as well as the instructions or processes, to interact with the interface.
* [**Robustness:**](https://www.w3.org/WAI/WCAG22/quickref/?versions=2.1&showtechniques=111&currentsidebar=%23col_overview#principle4) Refers to the content's ability to be reliably interpreted by a wide variety of devices and assistive technologies, ensuring compatibility with different platforms and tools.

These principles, established in the [**Web Content Accessibility Guidelines.**](https://www.w3.org/WAI/fundamentals/accessibility-intro/es)(WCAG), guide the development of inclusive digital products, ensuring they are accessible and usable for everyone, including people with disabilities.

**4. Final Conclusions**

This reflection aims to **consolidate the course's key concepts** and synthesize the **practical experience** gained throughout the four stages of the methodology developed during the semester. To do this, you must provide **written answers** to the questions indicated in the challenge statement. Consider the following points:

* **Organize Your Ideas Before You Begin:** Take a few minutes to **reflect on each question before writing**. Make a list of **key points** you want to mention, including **specific examples** of the activities carried out in the project.
* **Use the Learned Vocabulary**: Integrate key concepts from the course, such as **User-Centered Design (UCD),** **usability, accessibility, universal design principles, affordance, and visibility**, among others. Explain **how you applied these terms** in the development of your prototype.
* **Support Your Answers with Concrete Examples**: For example, if you discuss **user testing**, **mention what you discovered, how those findings influenced your design decisions and the final results.**
* **Include Your Perceptions**: Share **how you felt**during each stage of the project, **which techniques or tools**you found most useful, and **what aspects you believe you could improve** in future projects.
* **Be Critical and Reflective**: Identify **successes and challenges** you faced during the project. Explain **how you solved problems** and what you learned from those experiences.
* **Pay Attention to Your Writing**: Use **clear and professional language**. Review your text to avoid **grammatical or punctuation errors**. This will also help you **effectively convey your ideas**.
* **Relate It to Future Applications**: In the final question, reflect on **how you could apply what you learned** in **real-world situations**, such as **academic, professional, or social projects**.

## **Instructions for the assignment C4**

📍 EVALUATION

In this fourth challenge, it's time to **evaluate**our prototype to assess whether we have improved both quantitatively and qualitatively. To do this, we will conduct a **user test**, analyze the **usability**of a peer's proposal, evaluate the **accessibility**of our proposal, and finally, we will prepare the**final report.**

**1. User Testing**

👉 Conduct a new round of [**user tests**](https://human-computer-interaction.aula.uoc.edu/user-testing/), this time focusing on **your prototype**. Use the script you developed in challenge 2 as a reference, but enrich it with additional elements that allow you to focus on the improvements and changes you have implemented in your prototype. If possible, try to involve the same participants as in challenge 2. This will allow you to obtain qualitative, comparative feedback and reflect on the design decisions of your prototype. If you cannot have the same users, compare the comments of the current participants with the observations collected in challenge 2.

⚠️ Include in the document:

* Description of the users
* Script of the session
* Analysis of results
* Reflection with the proposed improvements

**2. Usability of a Peer's Proposal**

👉 Define in your own words Nielsen's ten (10) heuristics to use in the evaluation of a classmate's prototype. Choose a proposal from a classmate on [Present your prototype](https://aula.uoc.edu/courses/50236/discussion_topics/1017153) discussion forum to carry out the evaluation.

* List ten (10) heuristics that you have used in the evaluation
* Description of the execution of the technique
* Analysis of the obtained results
* Proposal for improvements

#### **3. Evaluating the Accessibility of Our Proposal**

It's time to reflect on the accessibility of the prototype you have created. On this occasion, we will conceptually analyze the **Level A** related to the principle **Perceptible**. For each criterion, explain if it is met.

👉 You can consult the definition of the **level A** criteria of Perceptibility on the [**W3C website**](https://www.w3.org/WAI/WCAG22/quickref/?versions=2.1&showtechniques=111).

### **4. Reflections**

To conclude the **evaluation phase**, reflect on the **lessons learned** and how the activities carried out in this stage, such as **user testing, heuristic evaluation, and accessibility analysis**, helped assess and improve your design. Select **one (1)** of the following reflection questions and record a **video of up to 3 minutes** with your response.

1. Which part of the user feedback from the final test changed your perception of the prototype’s effectiveness?
2. When evaluating a peer’s prototype, what positive element would you apply to your future projects and why?
3. How did analyzing the WCAG criteria in your prototype improve your understanding of accessibility?
4. When reflecting on the four stages in the final report, what did you discover about your design process?
5. If you had more time to work on the prototype, what aspect would you improve and why?

**5. Final Conclusions**

👉 As a final activity, reflect on your **learning experience** in creating your prototype. Provide **written answers** to the following open-ended questions, ensuring you develop your ideas with **clarity, specific examples, and critical analysis**.

**1. Reflection on the Impact of the Techniques Used:**

*Which techniques from the UCD process (such as benchmarking, User Journey, user testing, or heuristic evaluation) had the most significant impact on your prototype’s accessibility and usability, and why were they so effective?*

**2. Design Evolution and User Experience:**

*Comparing the initial prototype with the final version, what significant improvements did you implement to optimize the user experience, and how did HCI concepts (such as affordance, visibility, and feedback) influence these changes?*

**3. Application of Universal Design Principles:**

*During the creation of your prototype, which Universal Design principles were the most challenging to implement, and how did you overcome these obstacles to ensure accessibility and inclusion?*

**4. Learnings on Accessibility and User Needs:**

*What did you discover about the barriers faced by users with visual or motor disabilities, and how did these findings guide your design decisions throughout the project?*

**5. Professional Projection of Learning:**

*After completing this project, how will you apply your knowledge of user-centered design, universal design, accessibility, and usability in future professional contexts?*

### **Deliverables**

To complete the submission of this activity, please attach the **final document** and the **reflection video** in the **Delivery Activity C4** section. Your document must be uncompressed in **PDF format**, and the video must be in **.mp4 format**. This will ensure that the content remains **accessible** and maintains its **original format**, making it easier to review.

⚠️ Remember to verify that all elements of your work are included and correctly displayed in the document before uploading it.

### **Assessment and evaluation criteria**

The evaluation will take into account the presentation of the document, as well as its structure (cover, index of contents, development of the answers), legibility (adequate font for reading and body size of 12 points) and organization (numbered pages, heading with the name of the student and the degree course). Writing, clarity, expression, and spelling will be valued.

✏️ As for the evaluation criteria for each of the tasks, they are described in the [[**Challenge 4 rubric**](https://aula.uoc.edu/courses/50236/assignments/585932)**.**](https://aula.uoc.edu/courses/50236/assignments/585931)

**IMPORTANT**

In this activity, only limited use of artificial intelligence tools is permitted. Specifically, in a UX design project, both textual and visual AI tools can be used to generate and sketch ideas, contextualize concepts, propose prototypes, or combine elements innovatively or alternatively. If these tools are used, **it is necessary to explicitly and correctly cite the use of AI tools** in the work's development. This includes: indicating in the submission which **tools** have been used in each section of the activity, the **objectives**, the **prompts** used, the **response** obtained, and the process followed to review and edit the output. To do this correctly, consult the guide [How should we cite AI in our works?](https://openaccess.uoc.edu/bitstream/10609/148823/1/U2_17_GuiaCitarIA_CAT.pdf) Information on what is considered irregular conduct and its consequences can be found in the teaching plan and the [UOC's website about academic integrity and plagiarism](https://campus.uoc.edu/estudiant/microsites/plagi/en/index.html). Remember that personal, confidential, or intellectually protected information must not be provided using generative AI tools.

Remember that improper use of generative AI, such as not reviewing the obtained response or failing to cite the used tools, will be considered irregular conduct in the assessment. In case of doubt, consult with the teaching staff.

## **Answers for the assignment C4**

## 1️⃣User Testing

1️⃣.1️⃣ Introduction

For this user testing I worked with the same participants from the CA2 session so I have been able to gather qualitative comparative feedback.

* **Benito**: 65 Years old, Retired Physical Education teacher with severe hearing loss.
* **Lorena**: 47 Years old, Administrative Assitan with Visual Impairment.

Using the same users allows me to better measure how the updated prototype performs in terms of usability and accessibility compared to the Google Maps tested in CA2.

Regarding the Session Script, two main test cases were evaluated, each with a proposed scenario and tasks to complete using the prototype built in Figma. Users perform the tasks and then answered a feedback form created in HTML for better result gathering.

The questions and actions were adapted to our specific prototype possibilities, aimed at providing quality feedback on the overall functionalities, but also to the special features added to each requirement. Report accessibility Issue for requirement 1 and send a test alert for requirement 2.

The limitations of this test were that not being a real application but a prototype in Figma the flow has several limitations. However, the interactions added to this prototype successfully helped to conduct proper user testing.

1️⃣.2️⃣ Session Script

1. **Introduction**

Hello, and thank you for participating in this user testing session!

Before we begin, I want to highlight that we are testing the application and not you. There are no right or wrong answers, and your honest feedback is extremely valuable to us. This session will help us understand how to improve public transportation applications to make them more accessible and user-friendly.

This session will take approximately 45-50 minutes, you only need to complete a few tasks using the App Prototype application and then complete the survey.

**Preliminary Questions**

First, I'd like to ask you a few simple questions:

1. Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Age: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Occupation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Device Type: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. Operating System: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. Do you have any disabilities or impairments that affect how you use mobile applications? (Optional)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. How would you rate your comfort level with technology on a scale of 1-5, with 5 being very comfortable? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
8. How often do you use public transportation? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
9. Have you used any public transportation mobile applications before? If yes, which ones? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
10. **Test Case A - Accessible Route Planning**

**Proposed Scenario**

“You want to visit a friend who lives in the city center for a coffee. You require wheelchair accessibility and would like to find a route that meets your needs.”

**Tasks to attempt:**

**Task 1**

Start by planning a route from your current location to a destination in the city center (imaginary because the proposed scenario is not real). Try to adjust the route options to match your accessibility needs, such as using a wheelchair, avoiding stairs, and staying away from crowded areas.

**Task 2**

Review the route options provided. Choose one route and try to check if it includes step-by-step information about accessibility features, such as elevators or ramps.

**Task 3**

Imagine that you find an accessibility problem on the route. Try to report this issue through the app.

**Survey - Complete the following questions based on your experience:**

1. Were you able to adjust the route according to your accessibility needs?

* Yes, it was easy
* Yes, but it took time or was confusing
* No, I couldn’t do it

2. Was the accessibility information in the route details clear and easy to understand?

* Yes, very clear
* Somewhat clear
* No, it was confusing or missing

3. What type of accessibility information did you see in the route? (Select all that apply)

* Ramp availability
* Elevator information
* Other:
* I didn’t see any accessibility information

4. Did you find a way to report an accessibility problem on the route?

* Yes, and it was easy to use
* Yes, but it was difficult or confusing
* No, I couldn’t find the option

5. How would you describe the process of writing and sending the accessibility report?

* Very simple and clear
* Moderate. I understood it but needed to think a bit
* Complicated or confusing

6. Did the confirmation message after sending your report make you feel that your feedback was received?

* Yes, it was clear
* Somewhat but it could be clearer
* No, it wasn’t clear at all

7. Did you experience any barriers during this task? (Select all that apply)

* Text too small or hard to read
* Icons or labels not clear
* Hard to find what I needed
* None
* Other:

8. What accessibility barriers did you encounter during this task? (select all that apply)

* Text too small or hard to read
* Poor contrast between elements
* Buttons or touch targets too small
* Complex navigation or too many steps
* None

**Extra Question:**

What would you improve in the accessible route planning feature?? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. **Test Case B - Configurable Alerts**

**Proposed Scenario**

“You use public transport every day. You want to get alerts if something changes, like elevator problems or delays. You also want to check old alerts and test if alerts work well on your phone.”

**Tasks to attempt:**

**Task 1**

Go to the alerts section in the app. Try to choose what kind of alerts you want to get, like problems with elevators or delays in service.

**Task 2**

Try to change how you receive alerts. For example, make them visual, sound, or vibration.

**Task 3**

Use the option to send a test alert. Check if the alert appears on your screen.

**Task 4**

Look at the alert history. Try to find an old alert and read what it says.

**Survey**

1. Were you able to find where to choose the alert types?

* Yes, easily
* Yes, but with difficulty
* No, I couldn't find them

2. What alert types did you select? (Select all that apply)

* Route changes
* Elevator problems
* Delays or service problems
* Weather alerts
* None

3. Were you able to change how you get the alerts? (Select all that you tried)

* Visual (on screen)
* Sound
* Vibration
* I didn’t see these options

4. Did you use the test alert option?

* Yes, and it worked well
* Yes, but it was hard to understand
* No, I didn’t use it

5. Did you find the alert history and read past alerts?

* Yes, and it was easy
* Yes, but it was not easy
* No, I didn’t find it

6. Did the alerts make you feel more informed or safe?

* Yes, very helpful
* Somewhat helpful
* Not, not really helpful

7. Did you have any problems with this part of the app? (Select all that apply)

* Hard to find the alert options
* Hard to understand what to do
* Text was small or unclear
* No problems
* Other

**Extra Question:**

What would you improve in the alert settings or alert history? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. **Overall Feedback**

1. Based on your experience, how would you rate this App Prototype for accessibility on a scale of 1-5?

* 1 - Poor
* 2 - Fair
* 3 - Average
* 4 - Good
* 5 – Excellent

2. What was the most difficult aspect of using the Prototype?

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3. What features would you like to see added to make the Prototype more accessible?

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1️⃣.3️⃣ Test Results

NOTE: To recall the user characteristics, I have added in this memory the User Profiles developed in CA2 for each user.

**User I**

A screenshot of a computer

AI-generated content may be incorrect.

**Behaviours**

**Psychographics**

**Needs & Goals**



* Uses basic phone and apps with assistance.
* Avoids typing and prefers one-click interactions.
* Use public transportation occasionally for sporadic appointments.
* Relies on clear symbols and minimal steps
* Values simplicity and practicality.
* Avoids complicated interfaces.
* Prefers traditional ways and he is always very reluctant to learn new technologies.
* Large buttons and reduced typing.
* Easy instructions.
* Alerts that don’t require fast interaction.
* Minimalistic screens and easy-to-understand design.

**BENITO** is a 65-year-old retired Physical Education teacher who lives in Mutxamel, a suburban town near Alicante. He has three adult sons and enjoys spending time outside.

Benito has a hearing impairment and uses a hearing aid, but his condition has not improved significantly, which makes it hard for him to understand spoken instructions or audio notifications.

He has low tech skills and often needs assistance when setting up new applications. He values simple and accessible features that require minimal effort to use.

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**User II**



**Behaviours**

**Psychographics**

**Needs & Goals**

**LORENA** is a 47-year-old Administrative Assistant who lives in Terrassa, a city near Barcelona. She has three children: one adult son (27) and two younger kids aged 12 and 8.

She often uses public transport to move around the city.

**Lorena has a visual impairmen**t and uses screen magnifiers, voice feedback, and large text settings on her phone.

Her tech skills are medium, and she can navigate apps with some support. She prefers simple interfaces with high contrast and clear feedback.

* Uses high-contrast modes and large text on devices.
* Prefers voice feedback for interacting with apps.
* Plans trips carefully and in advance.
* Travels mostly during daytime.
* Values independence and safety.
* Prefers simple technology.
* Enjoys structure and routine.
* Clear audio descriptions and voice alerts.
* Easy-to-navigate interfaces.
* Real-time transport updates.
* Simple and effective accessibility settings.

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1️⃣.3️⃣ Results Analysis

Compared to CA2 Google Maps user testing, the prototype showed significant improvements in usability and accessibility for both requirements:

**What improved**

* Accessibility filters were found faster and were cleared for both users.
* The “Report Issue” feature added was visible and easy to use.
* The alert configuration was also visible and had more options (especially appreciated by Lorena).
* The feedback of the test alert seems to generate user confidence as expected.
* The alert history was marked by Benito as helpful to understand what had happened before.

**What still needs to improve**

* Both users indicate to have problems with “Text small or unclear”.
* Benito indicates also to struggle understanding the accessibility icons, and that adding legends (tooltips) may solve this problem.
* Lorena liked the alert options but suggested that adding voice notification preview would be recommendable.
* Both users got slightly confused navigating back to the home screen and other screens, which can be a signal of the limitations of the prototype, but also a space for improvement.

|  |  |  |
| --- | --- | --- |
| **Feature** | **Google Maps (CA2)** | **Prototype (CA4)** |
| **Accessibility filters** | Hard to find | Easy to find and apply |
| **Accessibility info clarity** | Poor | Clear |
| **Report issue option** | Not found | Found and used |
| **Alert settings visibility** | Not found | Visible and easy to adjust |
| **Alert configuration types** | None | Good, Customizable |
| **Text size and readability** | Poor | Better but need improvement |

**Proposed Improvements**

Based on the feedback obtained by tis testing, even if it’s only two users, we can spot some important suggestions for implementing:

* Increase the font size and contrast in the preferences screen.
* Add an option to play voice alert (especially for visually impaired users).
* Improve the navigation between screens. Maybe make a persistent “Home” button to make it easier to return to it.

## 2️⃣Usability of a Peer's Proposal

2️⃣.1️⃣ Nielsen’s 10 Heuristics

1. **Visibility of system status**

This principle says that we must ensure users receives proper feedback and are informed of what is happening.

1. **Match between system and the real world**

The app should use familiar language, icons or logic to match how the users thinks in real life situations.

1. **User control and freedom**

Users should be able to undo or to go back actions easily and without confusion.

1. **Consistency and standards**

This principle says that when we have similar actions in the app, the design should look and work accordingly.

1. **Error prevention**

The app should be designed to stop the errors before they happen, applying confirmation dialogs, popups, input validation, etc.

1. **Recognition rather than recall**

The app should display important actions or information visible and easily accessible. The main goal is to help the user avoid remembering things from one screen to another.

1. **Flexibility and efficiency of use**

The design should allow beginners and advanced users to perform tasks efficiently, for example implementing shortcuts.

1. **Aesthetic and minimalist design**

The design should avoid clutter, be clean and be able to recover from errors.

1. **Help users recognize, diagnose, and recover from errors**

The design should explain with clear messages and using simple language when something goes wrong so the user can clearly understand what happened and what to do.

1. **Help and documentation**

This principle says that if help is needed, it should be easy to find and understand.

2️⃣.2️⃣ How the evaluation was done

The prototype selected belongs to Alvaro ([link](https://drive.google.com/file/d/1QGOuTiEGQOuig24GChNlaoC-SPZUuY2T/view?usp=sharing)). I considered his presentation very clear and a very good starting point to perform a proper evaluation.

To conduct this evaluation, I followed the usability testing from the learning material as an example, so I analyzed each screen and interaction flow against the 10 heuristics of Nielsen and give a score from 1 (poor) to 5 (excellent) based on my observed usability.

2️⃣.3️⃣ Result of the Evaluation

|  |  |  |
| --- | --- | --- |
| **Heuristic** | **Observation** | **Score** |
| 1. Visibility of system status | The user clearly sees the map, the buttons and how to select the route and the options. Also, the details of the route are very visible. | 4 |
| 2. Match with real world | The app uses common travel terms like any transportation app. Also, the icon selection was good matching the elements of the real world. | 4 |
| 3. User control and freedom | I don’t see a clear navigation flow within the screens presented. | 1 |
| 4. Consistency and standards | Most of the elements follow standards, like the buttons that are big and clear. However, some buttons look different in some screens and with a smaller text. | 3 |
| 5. Error prevention | Theres no visible input validation or any confirmation dialogs in the prototype shown. | 1 |
| 6. Recognition vs recall | Mainly all the principal components such as route types, accessibility filters are visible and seem easy to select. | 5 |
| 7. Flexibility and efficiency of use | I can´t see any shortcut or advanced customization to implement this principle. | 2 |
| 8. Aesthetic and minimalist design | The interface is very clean, and it has no distractions preserving the logical layout. | 5 |
| 9. Error recovery support | No clear error messages or recovery flow it was shown in the prototype. | 2 |
| 10. Help and documentation | Help and documentation is not present (probably because this is a prototype). | 1 |

**Strengths**

* The interface is clean and minimalistic which helps to prevent the user from overwhelming.
* The accessibility filters are clearly displayed, and they were easy to select.
* The selection of the route logic is simple and understandable. The icons and labels match the users’ mental models.

**Areas for improvement and proposals**

* I will recommend adding confirmation dialogs or input validations.
* I did not observe a clear way to undo or go back (probably the limitation of the prototype flow creation) so, I will add more undo buttons to give the user more control over the application.
* Maybe add some help and tooltips that improve the usability for new users.
* Error message should probably be implemented.

## 3️⃣Evaluating the Accessibility of Our Proposal

In this section I have evaluated the prototype created in CA3 to check if it meets the basic (Level A) accessibility requirement under the WCAG Perceivable principle.

The goal is to ensure that all users, including those with disabilities, can perceive the information that is being displayed in the app.

It is important to recall that the evaluation has been performed over a mockup navigable but not a real app. As requested in the statement, the evaluation is conceptual (we can´t measure real interactions). For example, we can´t evaluate if an icon has an alt accessible, but instead we can see if there´s a text that is being with it, anticipating an accessible design, otherwise the prototype wouldn’t meet any criteria.

|  |  |  |  |
| --- | --- | --- | --- |
| **Code** | **Criteria** | **Conceptual Status** | **Explanation** |
| 1.1.1 | Non-text Content | Partially Met | Most of the icons are followed by text and labels. There´s almost no visual content without an explanation. However, some of the accessibility icons used to explain the accessibility features in the route details were spotted as not clear in Benito’s user testing, evidencing space for improvement in this criterion. |
| 1.2.1 | Audio-only and Video-only (Prerecorded) | Not Applicable | No audio or video in the prototype. |
| 1.2.2 | Captions (Prerecorded) | Not Applicable | No audio or video in the prototype. |
| 1.23 | Audio Description or Media Alternative (Prerecorded) | Not Applicable | No audio or video in the prototype. |
| 1.3.1 | Info and Relationships | Met | Related elements are grouped and clearly labelled (filters, alerts, preferences, etc.) |
| 1.3.2 | Meaningful Sequence | Met | Screens follow a logical order. The information can be read in a natural way (from top to bottom). |
| 1.3.3 | Sensory Characteristics | Met | There´s no instruction depending only on colour, sound or shape. All the actions use labels and icon together. |
| 1.4.1 | Use of Color | Met | Color is not the only way to show meaning. Text and icons are always present (alerts, filters, etc.) |
| 1.4.2 | Audio Control | Not Applicable | No audio in the prototype. |

Based on this analysis we can conclude that the prototype conceptually meets most of the accessibility criteria or rules under the **Perceivable principle Level A**.

Important icons have text labels, and the information is clear and well organized and also color is not the only way to show meaning. Some rules do not apply here because there is no audio or video.

As we mentioned, this is a conceptual evaluation performed using a visual prototype in Figma and not a real app, so in the future this should be tested with real users and in different devices to ensure these rules apply well for everyone.

## 4️⃣Reflections

See attached video.-

## 5️⃣Final Conclusions

1. **Reflection on the Impact of the Techniques Used:**

The technique that helped me the most was the flowchart. At the moment took me a considerable time because every time I was adding a step, many possibilities appeared in my mind, so it was challenging to decide or go back to define new branches. But after finishing the flowchart, everything became very clear. I could clearly understand the steps and the decisions that the user should make, and the problems they could find.

It was really much easier to create the prototype after that. The flowchart helped me organize my ideas and focus on what really matters for the user and also helped improve the usability because I could avoid confusing steps or extra actions.

1. **Design Evolution and User Experience:**

For me, the steps followed (from the wireframes to the prototype in Figma) were very important and relevant. At first, It looked like repeating the work, since my initial thought was to go straight to the prototype. However, starting the prototype from zero, it would have been very difficult because I had to learn to use Figma and also think about designing at the same time. Thanks to the wireframes that I built applying simple Word shapes, I could transform basic ideas into a design that evolve then in the final prototype. All this made the process much easier, and it also helped me to keep a clear user experience and follow the original plan step by step.

1. **Application of Universal Design Principles:**

The **Simple and Intuitive Use** principle was by far the most difficult to apply for me. Most of the Universal Design Principles were good to study and understand, and some of them were easier to apply because they felt more natural and intuitive. But trying to follow all the principles at the same time made it hard to keep things simple. I had to make trade-offs in the design, and for me was sometimes very complicated to decide what to keep or what to remove.

One way I solved this was by revisiting the design and removing elements that were nor essential. I applied the same technique I sometimes use when I write a work email: I first write everything until I finish, and then I star re-reading and deleting what is not essential. This technique helped me to keep the design simple and focused, while still following the main ideas of Universal Design.

1. **Learnings on Accessibility and User Needs:**

I learned that users with accessibility needs face real problems when using applications. I was present when performing the user testing and I saw how small decisions can generate big changes and also big barriers. For example, if a route includes stairs and there is no clear warning, the app becomes useless for wheelchair users. The scope of this simple accessibility need require not only to define a “wheelchair accessible” filter such as the ones the apps in the use case have, but to be more precise with the information with filters like “Avoid Stairs” or “Elevator Required”. Also, the report accessibility issue feature added was triggered by the same lesson learned. These simple design actions made the app better for everyone.

1. **Professional Projection of Learning:**

Thanks to this course, I have not only learned the concepts, but I have already applied them in my professional work. I am currently working as a Data Engineer, not a designer, but the techniques from this subject helped me to develop a project to improve our dashboard portfolio.

First, I created user profiles based on what I learned in the course. I studied and defined the different types of users (internal employees) who use our dashboard and defined the profiles (like executive, decision makers, analyst, etc.). I assigned each dashboard and icon that shows which user type it is best for. This helps people find what they need in the dashboard portfolio faster.

I also conducted a user testing session with selected employees with different profiles and give a series of tasks to perform with the dashboards, using the same model from this subject. Based on this, we gather a lot of feedback for the team, and we were able to spot many changes needed and also improve the usability by adding filters or accommodate layout elements but mainly by documenting and adding help guidance on the dashboard actions.

Because of this course, I now use HCI principles, accessibility and universal design ideas in a real and practical way. These are not future plans, but real tools I already use every day to design better, cleaner and more user-friendly data reports and dashboards.

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AI-generated content may be incorrect.For obvious confidentiality reasons, I can’t show the results of these HCI based project, but I am leaving here some examples evidences of the work done: