Empathy-Centric Design of a System to Evaluate and Repair Accessibility Barriers

AFRA PASCUAL ALMENARA (*)

GRIHO research group
Polytechnic School,
University of Lleida (UdL).
Lleida (Spain).

afra.pascual@udl.cat

MIREIA RIBERA

Departament de Matemàtiques i Informàtica.
Universitat de Barcelona (UB)

ribera@ub.edu

TONI GRANOLLERS SALTIVERI

GRIHO research group
Polytechnic School,
University of Lleida (UdL).
Lleida (Spain).

Toni.granollers@udl.cat

Presentation
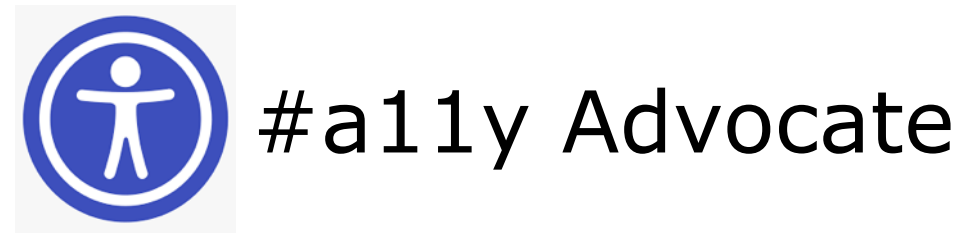# Afra Pascual Almenara

University of Lleida (Spain)

Teacher of Dynamic Web and Web Design

Web accessibility Researcher

#a11y Advocate

Afra-Pascual-Almenara

ResearchGate   **Linked** in

Outline

1. Introduction
2. Previous research
3. EmpathicEditor4Accessibility
4. Evaluation of EmpathicEditor4Accessibility
5. Conclusions

The CHI2022 workshop EmpathiCH! Afra Pascual Almenara. April 26, 2022

3/33

INTRODUCTION

Introduction

About 15-20% of the global population has some type of disability

Introduction

About 15-20% of the global population has some type of disability

There are laws of web accessibility

Introduction

About 15-20% of the global population has some type of disability

There are laws of web accessibility

BUT…. less than 10% of web sites are accessible

Introduction
What is the problem?

Introduction
Prosumers

The CHI2022 workshop EmpathiCH! Afra Pascual Almenara. April 26, 2022

9/33

Introduction
Prosumers

Prosumers don't know about web accessibility

The CMS do not provide support for developing accessible websites

The CHI2022 workshop EmpathiCH! Afra Pascual Almenara. April 26, 2022

10/33

Introduction
To solve the problem

PREVIOUS RESEARCH

The CHI2022 workshop EmpathiCH! Afra Pascual Almenara. April 26, 2022

12/33

Previous research
User tests

I feel bored when I can't see an image without alternative text

We registered comments, experiences, expressions and moods of users

Tested 40 users whit disabilities

Moods were classified with emoticards

All data were stored on a database

Previous research

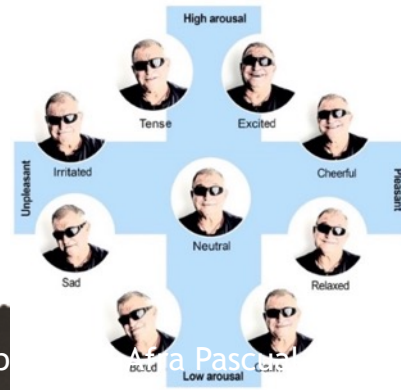- Pascual, A., Ribera, M., Granollers, T. (2013). **Grado de afectación de las barreras de accesibilidad web en usuarios con discapacidad intelectual**. Interacción 2013.

- Pascual, A., Ribera, M., Granollers, T., Coiduras, J. (2014). **Impact of accessibility barriers on the mood of blind, low-vision and sighted users**. Procedia Computer Science, 27, 431-440. https://doi.org/10.1016/j.procs.2014.02.047.

- Pascual, A., Ribera, M., Granollers, T., (2014). **Impact of web accessibility barriers on users with hearing impairment**. Interacción'14: XV International Conference on Human Computer Interaction, 1-2, https://doi.org/10.1145/2662253.2662261.

- Pascual, A., Ribera, M., Granollers, T., (2015). **Impact of accessibility barriers on the mood of users with motor and dexterity impairments**. Journal of accessibility and design for all, 5(1), 1-26, https://doi.org/10.17411/jacces.v5i1.93.

EMPATHIC EDITOR 4 ACCESSIBILITY

EmpathicEditor4Accessibility
Main goals

1) **Communicate accessibility barriers in a more empathic way**, offering a personal perspective of accessibility barriers built upon real people's perception.
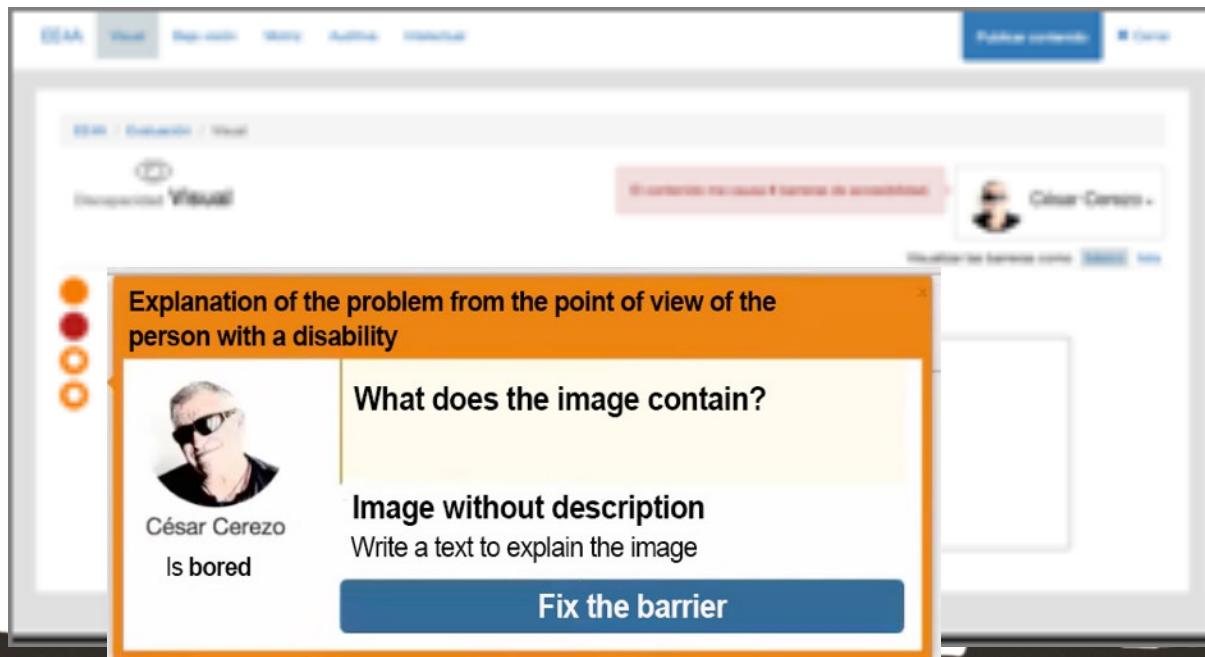
EmpathicEditor4Accessibility
Main goals

2) **Offer automatic repairs and specific suggestions to improve the accessibility of the content**, just before the publication of a content on a CMS

EmpathicEditor4Accessibility Development

- The tool was developed upon the **Semiotic Engineering** principles and following a **User Centered Design methodology**

https://mpiua.invid.udl.cat/
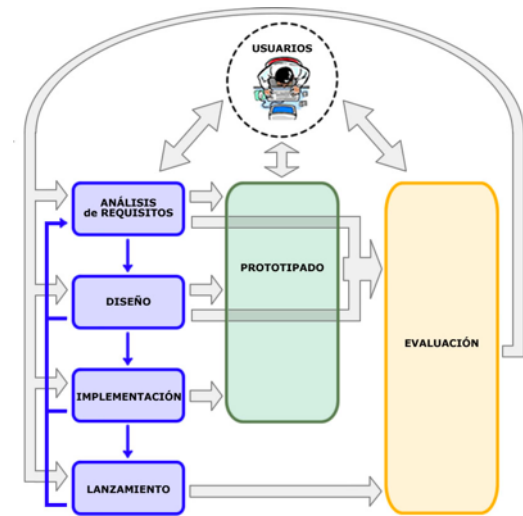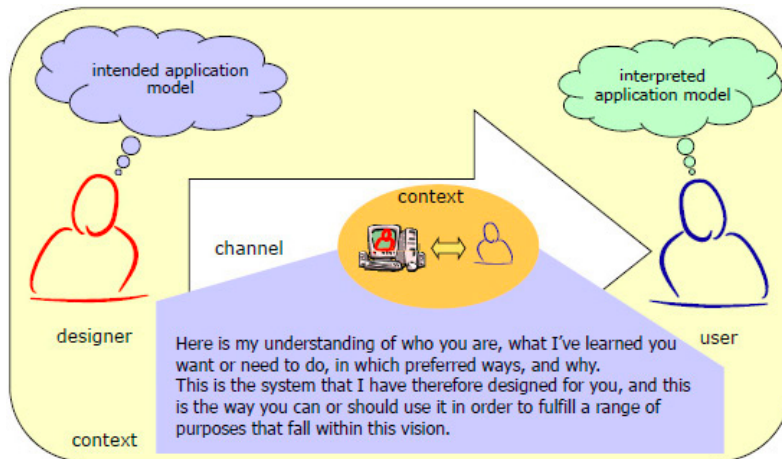
EmpathicEditor4Accessibility
System preview diagram

The CHI2022 workshop EmpathiCH! Afra Pascual Almenara. April 26, 2022

19/33

EmpathicEditor4Accessibility
System diagram – Step 1

Prosumer create content

Step 1

Web Page (Before evaluation)

Web Page (After evaluation)

Accessibility Data base

Evaluating online accessibility

Accessibility error report

Barrier 01: Images without alternative text

Images on web page don't have a description

Affects understanding | Automatic detection

👤 User feedback

🚫 **BLIND PEOPLE**

I don't know the content of the images and I lost information from web page

Very Serious

bored

Fix the problem | Close

Step 1. The content created by the prosumer is evaluated by an automatic evaluation tool (we used IDI Web Accessibility Checker API)

The CHI2022 workshop EmpathiCH! Afra Pascual Almenara. April 26, 2022

Griho

Universitat de Lleida

20/33

EmpathicEditor4Accessibility
System diagram – Step 2
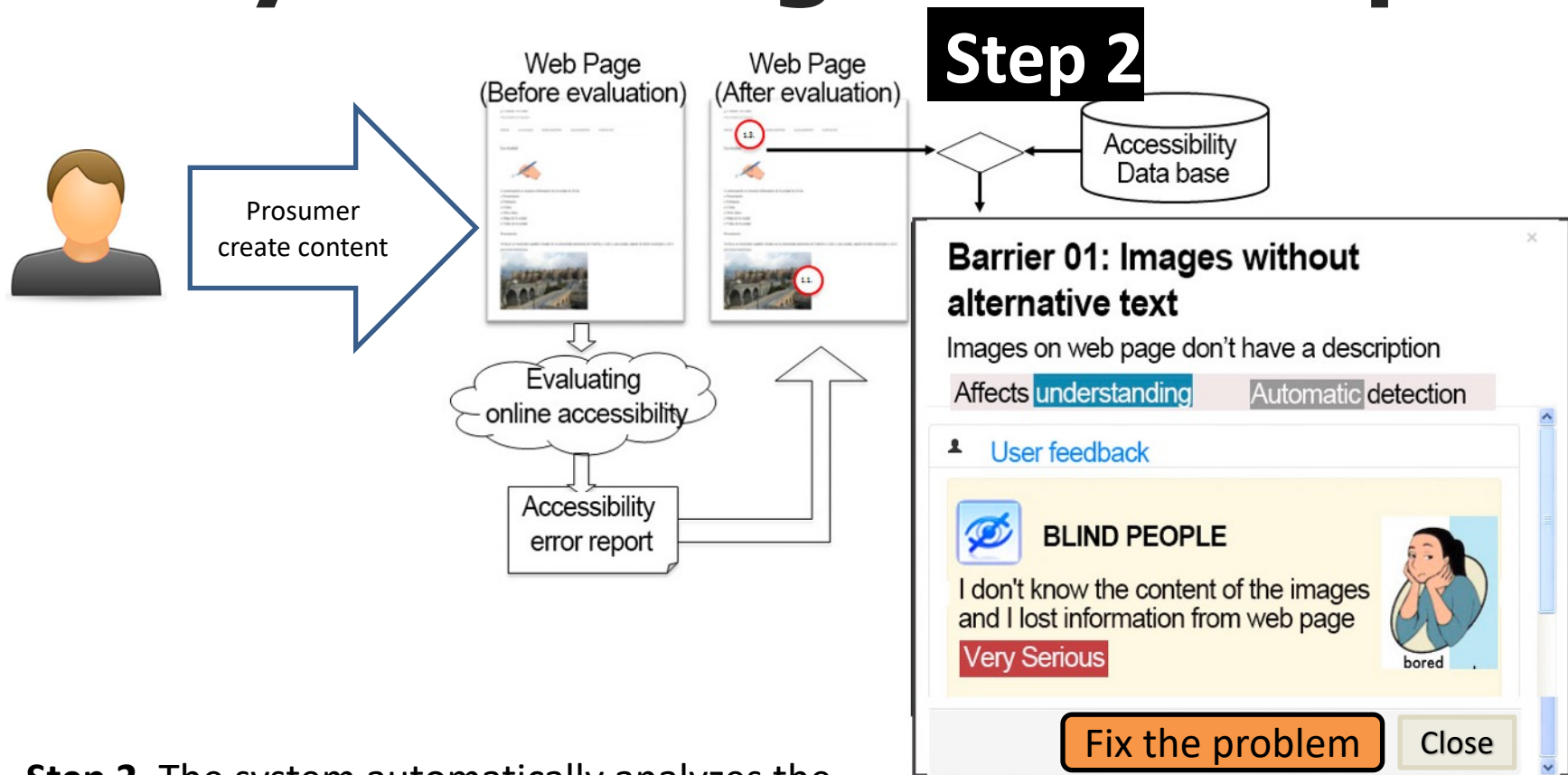
Step 2. The system automatically analyzes the errors from the WCAG guidelines and groups them by barriers

EmpathicEditor4Accessibility
System diagram – Step 3

Prosumer create content

Web Page (Before evaluation)

Web Page (After evaluation)

Accessibility Data base

Step 3

Evaluating online accessibility

Accessibility error report

Barrier 01: Images without alternative text

Images on web page don't have a description

Affects understanding   Automatic detection

👤 User feedback

👁 **BLIND PEOPLE**

I don't know the content of the images and I lost information from web page

Very Serious

bored

Fix the problem   Close

Step 3. Messages and information to fix each content barrier are organized and displayed on the interface. All information come from the database system within *EmpathicEditor4Accessibility*

Griho   Universitat de Lleida

EmpathicEditor4Accessibility
System diagram – Step 4
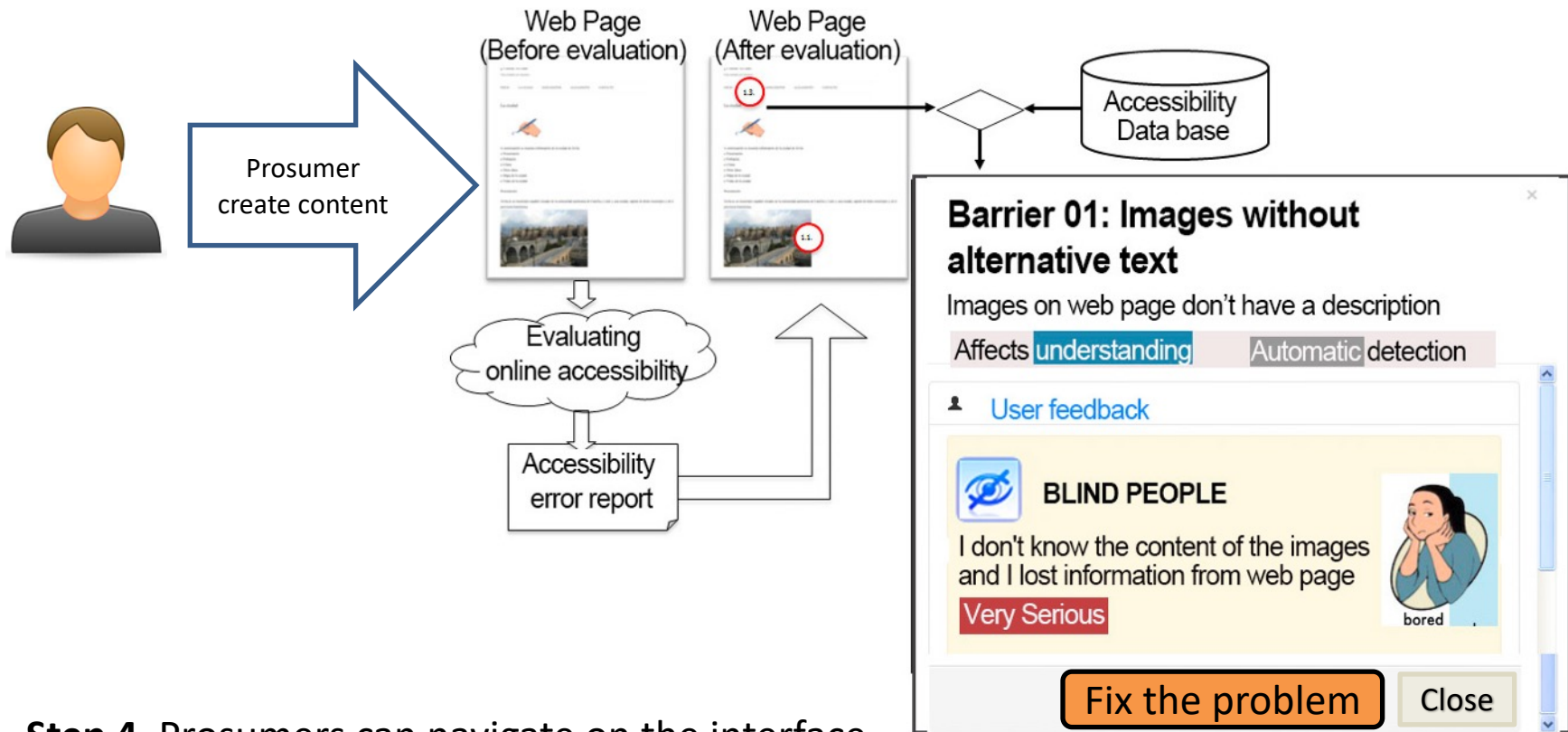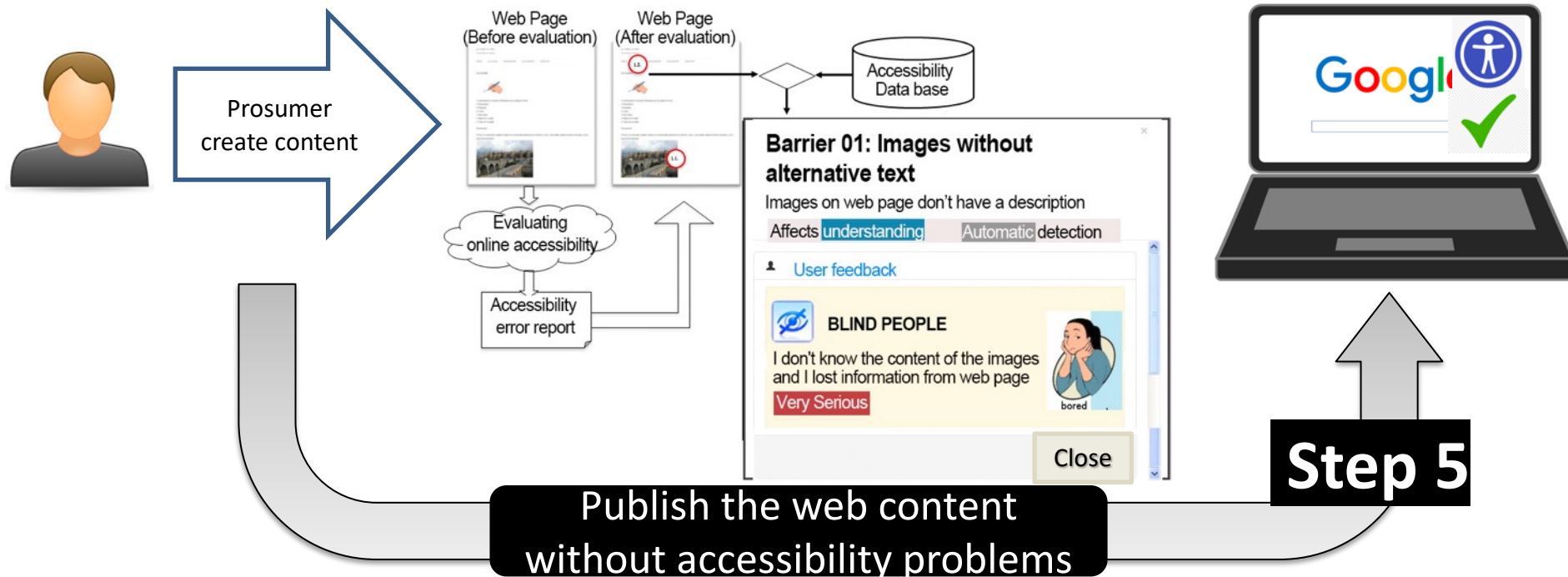

Step 4. Prosumers can navigate on the interface in order to know each barrier of accessibility and fix them.
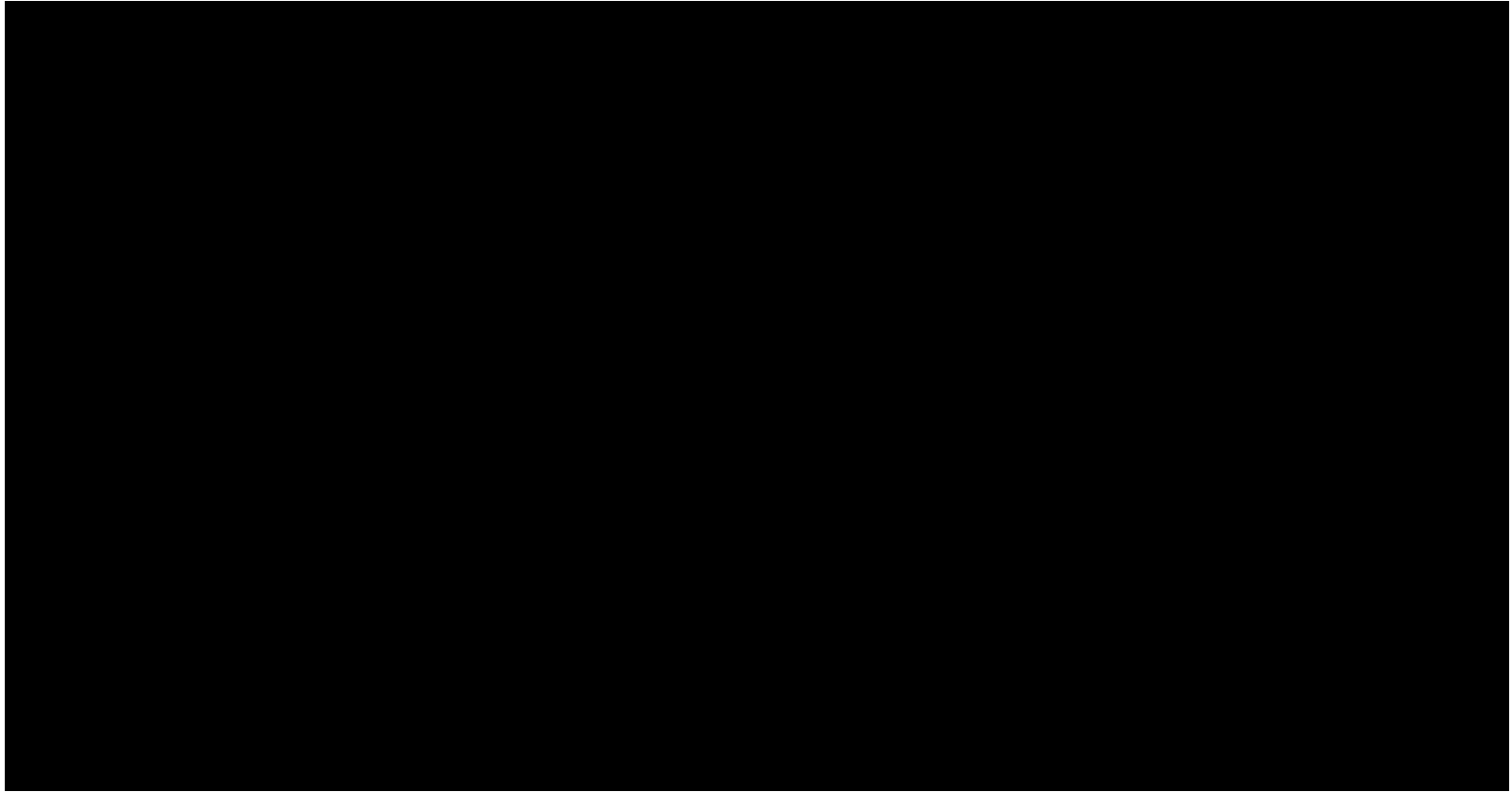
EmpathicEditor4Accessibility
System diagram – Step 5

Prosumer create content

Web Page (Before evaluation)

Web Page (After evaluation)

Accessibility Data base

Evaluating online accessibility

Accessibility error report

Barrier 01: Images without alternative text
Images on web page don't have a description
Affects understanding   Automatic detection

👤 User feedback

👁 **BLIND PEOPLE**
I don't know the content of the images and I lost information from web page
Very Serious

bored

Close

Google ✓

Step 5

Publish the web content without accessibility problems

Step 5. When the prosumer has solved all the accessibility barriers, he can publish the content without accessibility problems

Griho

Universitat de Lleida

EmpathicEditor4Accessibility
A demo about how it works
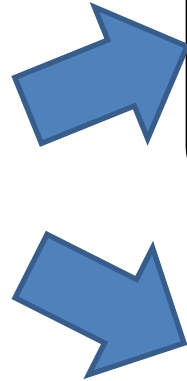

- https://youtu.be/eoV7kLT3ZDA

EVALUATING THE SYSTEM EMPATHIC EDITOR 4 ACCESSIBILITY

Empathic communication of accessibility barriers in web 2.0 editing

EmpathicEditor4Accessibility

Tested 8 prosumers

TAW CMS System

Pascual, A., Ribera, M., Granollers, T. (2015). Empathic communication of accessibility barriers in web 2.0 editing. W4A '15
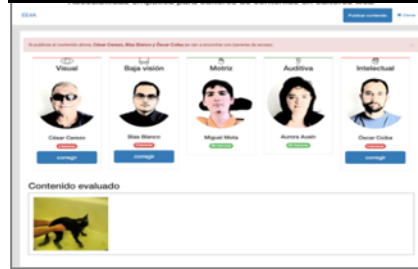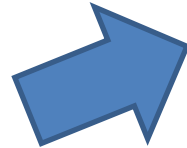
Empathic communication of accessibility barriers in web 2.0 editing

EmpathicEditor4Accessibility

Tested 8 prosumers

TAW CMS System

Pascual, A., Ribera, M., Granollers, T. (2015). Empathic communication of accessibility barriers in web 2.0 editing. W4A '15

Communicability of two web 2.0 accessibility evaluation tools

- Semiotic Inspection Method (SIM)

Communicability of two web 2.0 accessibility evaluation tools

EmpathicEditor4Accessibility

Prosumers

TAW CMS System

Technical users
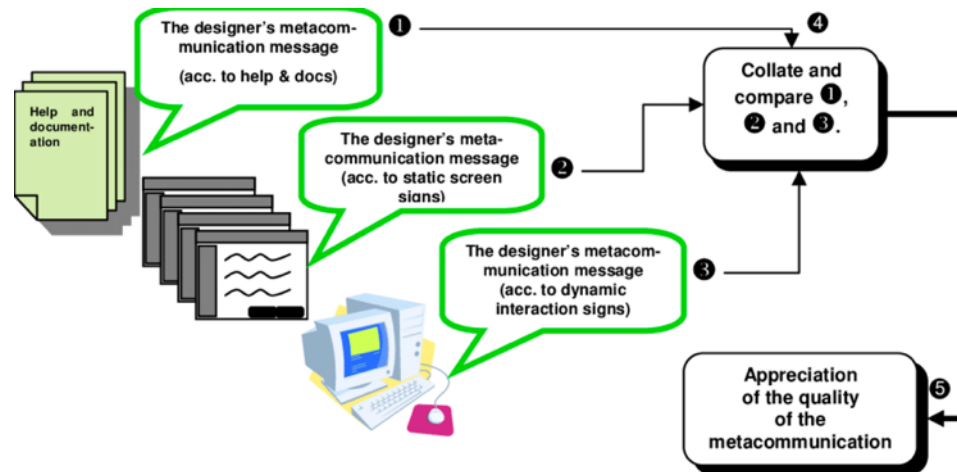
10th Computing Colombian Conference (10CCC),

Pascual, A., Ribera, M., Granollers, T. (2015) **Communicability of two web 2.0 accessibility evaluation tools**. 10th Computing Colombian Conference (10CCC), 2015, pp. 269-272, doi: 10.1109/ColumbianCC.2015.7333425

The CHI2022 workshop EmpathiCH! Afra Pascual Almenara. April 26, 2022

Universitat de Lleida

30/33

CONCLUSIONS

Conclusions

- The *EmpathicEditor4Accessibility* system
  - **facilitates empathy with accessibility problems**
  - The **communication design** and the **empathy** built into the system **makes the tool suitable for non-technical** audiences with no previous knowledge on web development
  - Following **User Centered Methodology** in the development of the system and considering **Semiotic Engineering** to create the informative messages **has provided a more empathic tool for communicating issues related to the WCAG guidelines**

Afra Pascual Almenara

✉ Escola Politècnica Superior

Universitat de Lleida (UdL)
C/ Jaume II, 69
25001 – Lleida (Cataluña)

@ afra.pascual@udl.cat

in https://www.linkedin.com/in/afra-pascual-almenara/

R^G https://www.researchgate.net/profile/Afra-Pascual-Almenara