# Accessibility/Usability Through Advanced Interactive Devices

**Moderator**
Leslie Miller, Iowa State University, USA

**Panelists**
Silvana Roncagliolo, Pontificia Universidad Catolica de Valparaiso, Chile
Alma Leora Culén, University of Oslo , Norway
Volker Paelke, Institut de Geomàtica - Castelldefels, Spain
Lasse Berntzen, Vestfold University College - Tønsberg, Norway

ACHI 2012

# Two Different Issues

The panel will look at two very different issues:
1. Accessibility
2. Usability

# Common Aspect of interactive devices

- **Computers** are critical to interactive devices.  So we all work in interactive devices.

- There is a wide and growing number of devices that can be considered interactive devices.

# Common devices

- Computers, especially tablets and data phones
- Interactive television
- GPS systems
- Game devices
- Toys

# Becoming Common

- Interactive television
- Cars
- Appliances

# Less Common

- Virtual reality environments
- Robots
- Simulators

# Functionality

Is it an interface question or is it a backend software question?

To a software developer, the functionality of the system can only be reflected by the user interface.

# Panelist Presentations

- Silvana Roncagliolo
- Alma Leora Culén
- Volker Paelke
- Lasse Berntzen

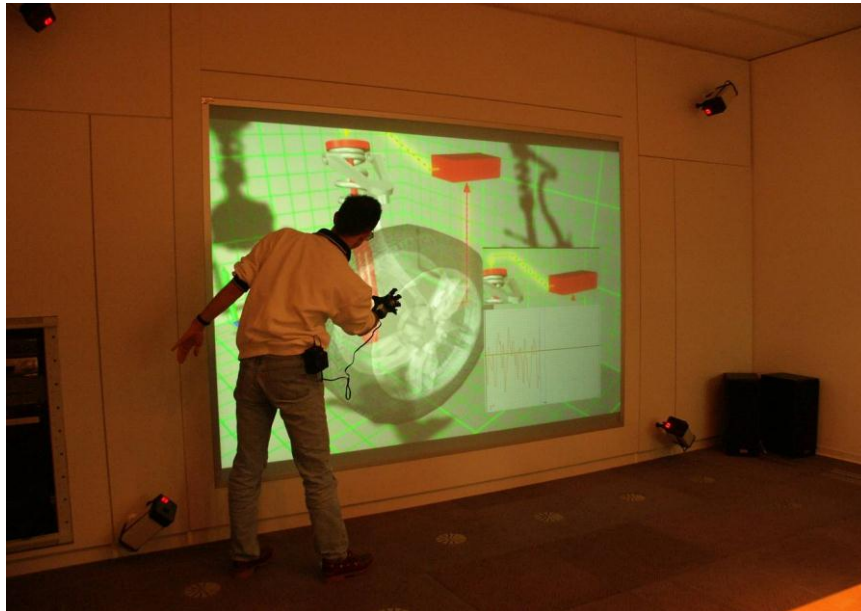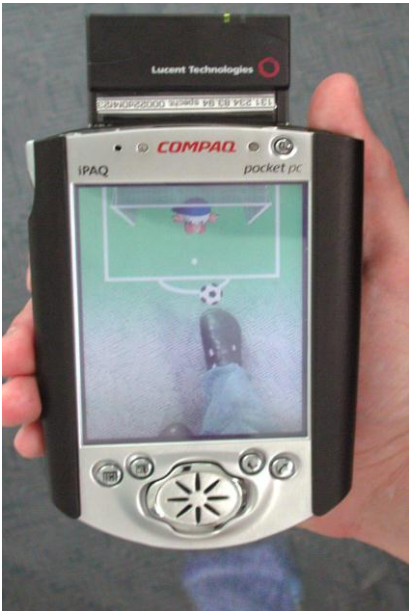- Questions and Comments from Audience

# Accessibility/Usability Through Advanced Interactive Devices

## A Geo-Visualization Perspective

**Volker Paelke**
**Institut de Geomàtica**
**Castelldefels (Barcelona), Spain**

**volker.paelke@ideg.es**

**INSTITUT DE GEOMÀTICA**
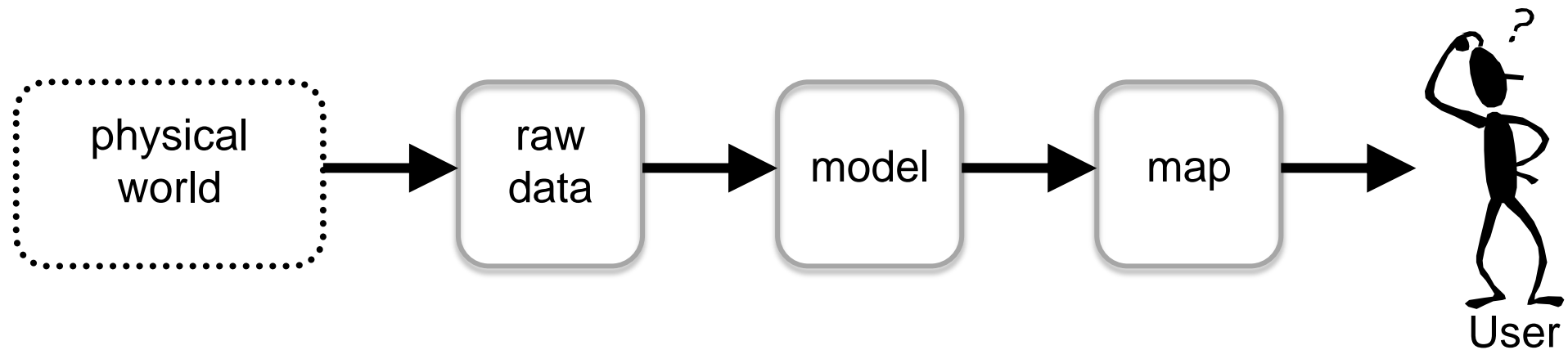
# Background



- Research in Augmented and Virtual Reality + 3D Visualization since 1997

- 1997 – 2004 C-LAB:University of Paderborn (Germany) + Siemens

- 2004 – 2010 Leibniz University of Hannover (Germany)

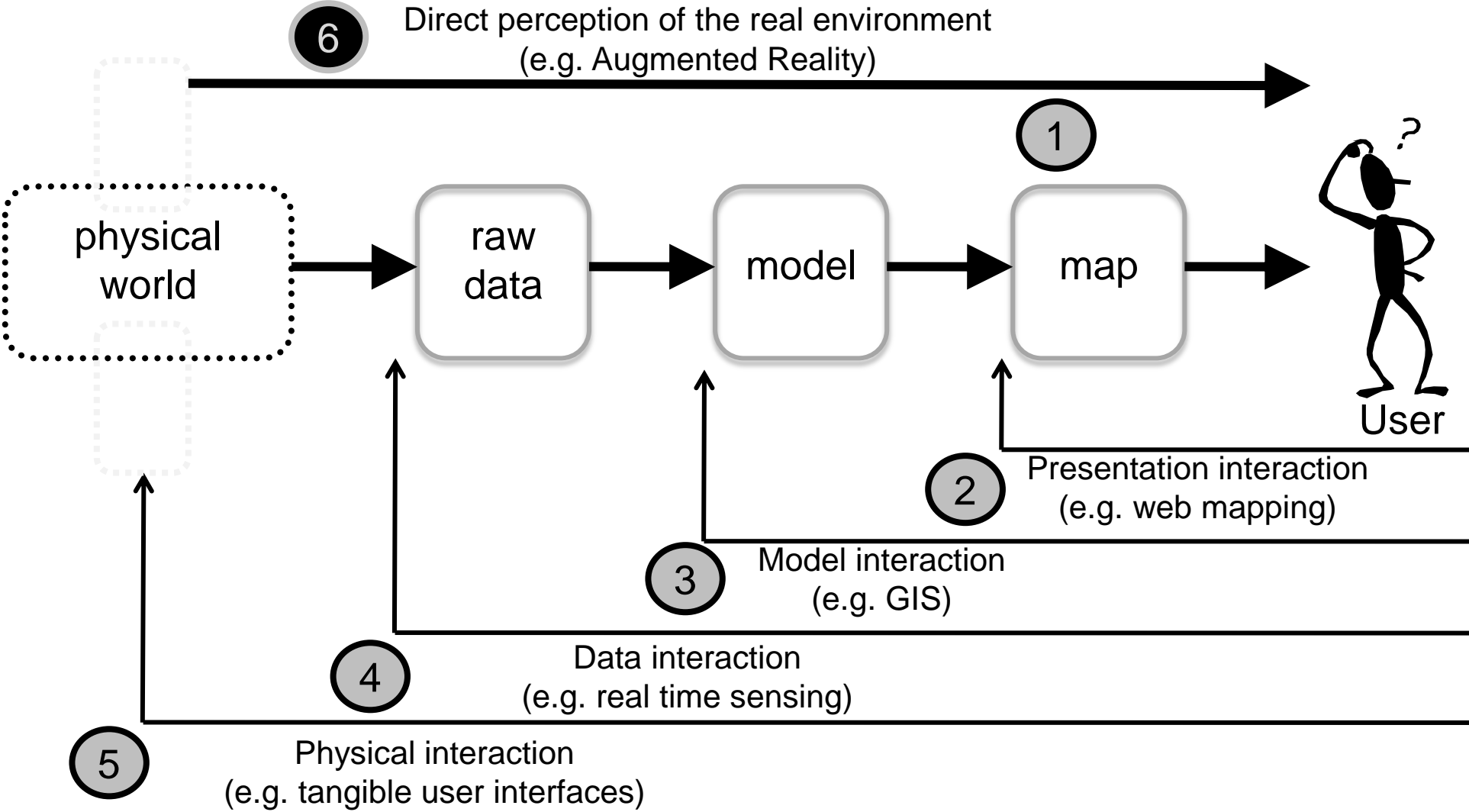- since 2010 Institut de Geomàtica (IG), Castelldefels (Barcelona, Spain)

# Current research @ IG



physical world → raw data → model → map → User

**Central requirement im „maps":**

To provide **users** with the **spatial information** required for a **task.**

# Current research @ IG



**6** Direct perception of the real environment
(e.g. Augmented Reality)

**1**

| physical world | raw data | model | map |

User

**2** Presentation interaction
(e.g. web mapping)

**3** Model interaction
(e.g. GIS)

**4** Data interaction
(e.g. real time sensing)

**5** Physical interaction
(e.g. tangible user interfaces)

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## Status: Usability of advanced interactive devices in Geoinformation

Augmented reality

Large-scale display visualization

**Multi-touch interaction**

    (collaboration with C-LAB (University of Paderborn, Atos))

    Much work on development of base technology and individual interaction and visualization techniques

    What are reasonable usage-scenarios?

    Are those systems intuitively usable ?

    Where are the limitations of such systems ?

    What new challenges occur using such systems ?

# Status: Usability of advanced interactive devices in Geoinformation



touch       tangible       pen

## Challenge: The way forward

New technologies have high potential to improve usability and accessibility

Large toolset for UI designers

Design must be driven by end user requirements in specific applications

Test, test, test > how can we simplify user tests, capture insights

Build on existing expertise

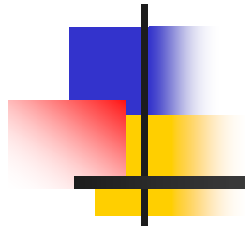make expertise easily accessible to developers

technology

"usability"

Methodology, Tools, Repository,…
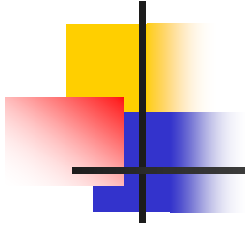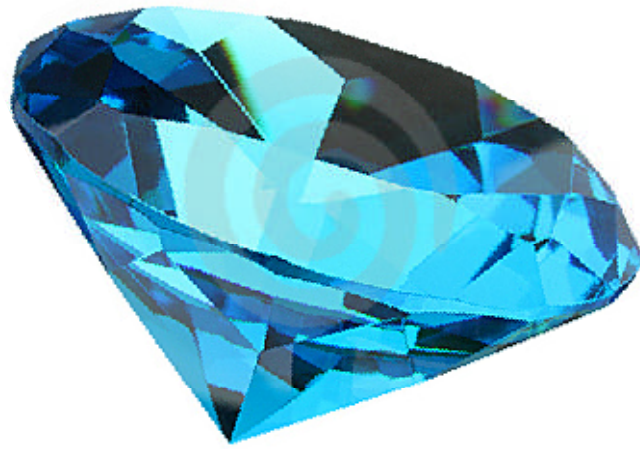
# Thank you for your attention!

# ACHI Panel

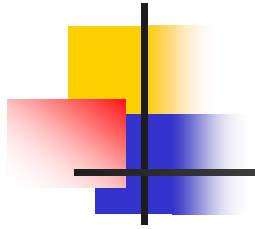# Accessibility/Usability Through Advanced Interactive Devices

Silvana Roncagliolo

Escuela de Ingeniería Informática

Pontificia Universidad Católica de Valparaíso, Chile

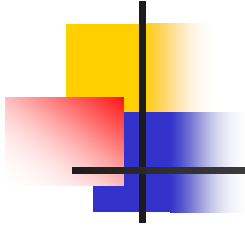# Accessibility/Usability Through Advanced Interactive Devices

# Accessibility/Usability Through Advanced Interactive Devices

despite how technical and novel

the proposed solution is …

one still has to evaluate its usability !

current definition still stands ?

and we can adapt …

or

is it better to have a new definition ?

with new methods …

# Usability

Usability: What, Why, How?

Usability Evaluations:

   Past, Present, Challenges

# Usability

the extent to which a product can be used

- by specified users

- to achieve specified goals

- with effectiveness, efficiency and satisfaction

- in a specified context of use.

*(ISO 9241)*

# Usability: What, Why, How?

**Research questions:**

- How can an interactive system be developed to ensure its usability?
  - Attributes, paradigms, principles, guidelines
- How can the usability of an interactive system be proved or measured?
  - Inspections and tests
- Applications based on emerging technologies: should usability be re-defined?

# Usability Evaluations: Past, Present, Challenges

- **Usability Inspection:** performed by usability professionals, based on usability heuristics and their on judgment

- **Usability Testing:** designed by usability professionals, performed with real (or representative) users

# Usability Evaluations:
# Past, Present, Challenges

- Usability evaluation for applications based on emerging information technology: new challenges!
    - Is it the classical concept of usability still valid?
    - Which are the dimensions of the (new) usability,
        into the context of new interaction paradigms?
    - How can it be measured?
    - How should we develop for (better) usability?
- There is a need for new evaluation methods or at least for the use of traditional evaluations in novel ways!

# Usability Evaluations: Past, Present, Challenges

- Literature focuses on describing the advantages and disadvantages of usability evaluation methods but not on how to develop new methods and/or usability heuristics

- Measuring the usability of applications based on emerging information technology became a challenging task!

# Usability Evaluations: Past, Present, Challenges

**Heuristic Evaluation:**

- 3-5 evaluators examines the system and its compliance with usability principles
- Usability problems: Severity, Frequency, Criticality
- (Relatively) cheap, intuitive, applicable early in the development process
- Able to find many usability problems, both major and minor
- However, it may miss domain specific problems….
- The use of appropriate heuristics is highly significant!

# Usability Evaluations: Past, Present, Challenges

Nielsen's 10 heuristics:

- Visibility of System Status
- Match Between System and the Real World
- User Control and Freedom
- Consistency and Standards
- Error Prevention
- Recognition rather than Recall
- Flexibility and Efficiency of Use
- Aesthetic and Minimalist Design
- Help Users Recognize, Diagnose, and Recover from Errors
- Help and Documentation

# Usability Evaluations: Past, Present, Challenges

Developing new usability heuristics:
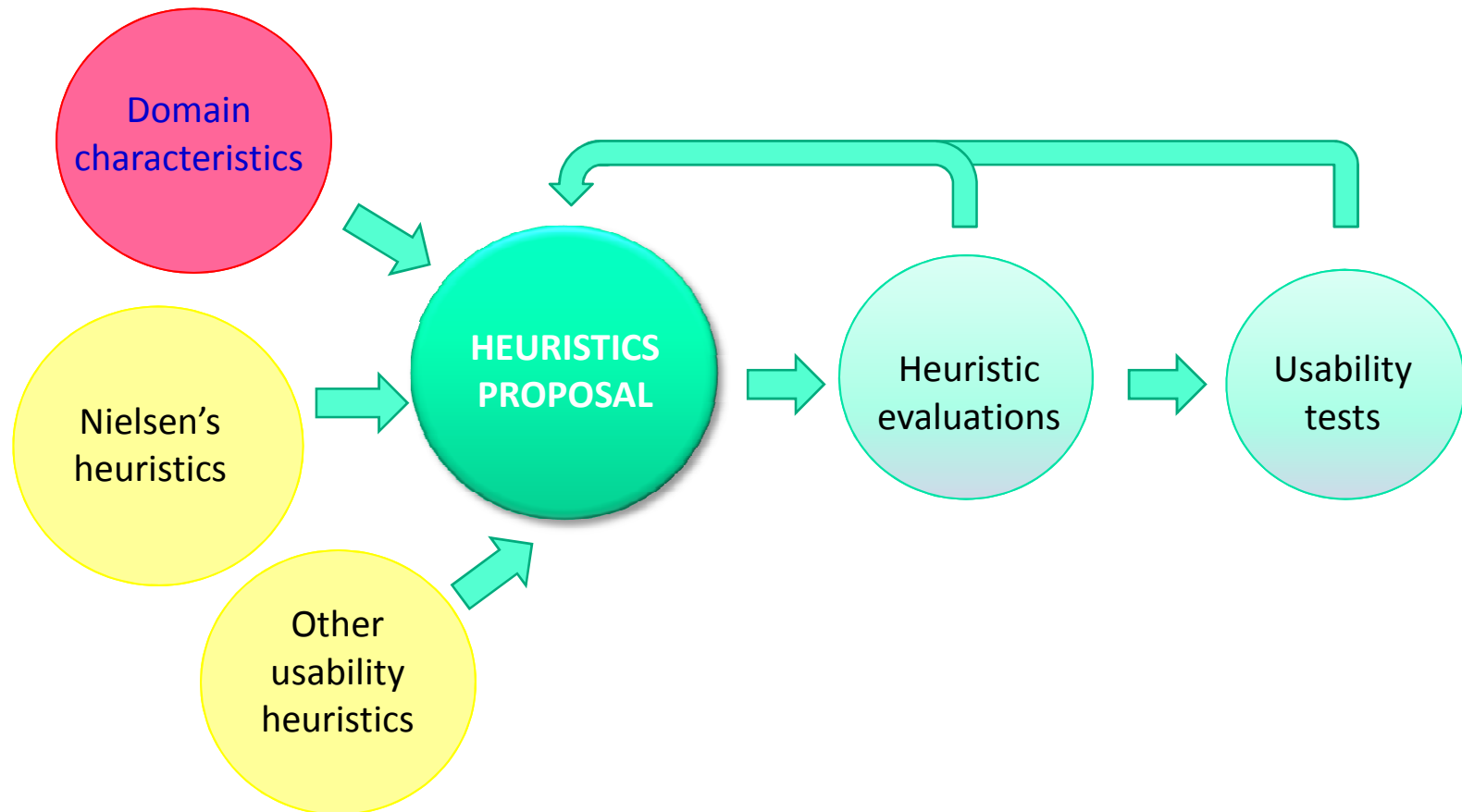
# Usability Evaluations: Past, Present, Challenges

A methodology proposal (*Rusu, Roncagliolo, Rusu, Collazos, 2011*):

- (1) An exploratory stage, to collect bibliography related with the main topics of the research.
- (2) A descriptive stage, to highlight the most important characteristics of the previously collected information.
- (3) A correlational stage, to identify the characteristics that the usability heuristics for specific applications should have.
- (4) An explicative stage, to formally specify the set of the proposed heuristics, using a standard template.
- (5) A validation (experimental) stage, to check new heuristics against traditional heuristics by experiments, through heuristic evaluations performed on selected case studies, complemented by user tests.
- (6) A refinement stage, based on the feedback from the validation stage.

Iterative, with feedback.

# Usability Evaluations:
# Past, Present, Challenges

Usability heuristics template:

- *ID, Name and Definition:* Heuristic's identifier, name and definition.

- *Explanation:* Heuristic's detailed explanation, including references to usability principles, typical usability problems, and related usability heuristics proposed by other authors.

- *Examples:* Examples of heuristic's violation and compliance.

- *Benefits:* Expected usability benefits, when the heuristic is accomplished.

- *Problems:* Anticipated problems of heuristic misunderstanding, when performing heuristic evaluations.

# Conclusions

- New usability heuristics proved their potential

- The proposed methodology proved to be useful

- More validation is needed

- It should be a collaborative work…

- Also remember: for good Usability consider a systematic approach during the whole software development process

- There still is a lot of work to be done !!!

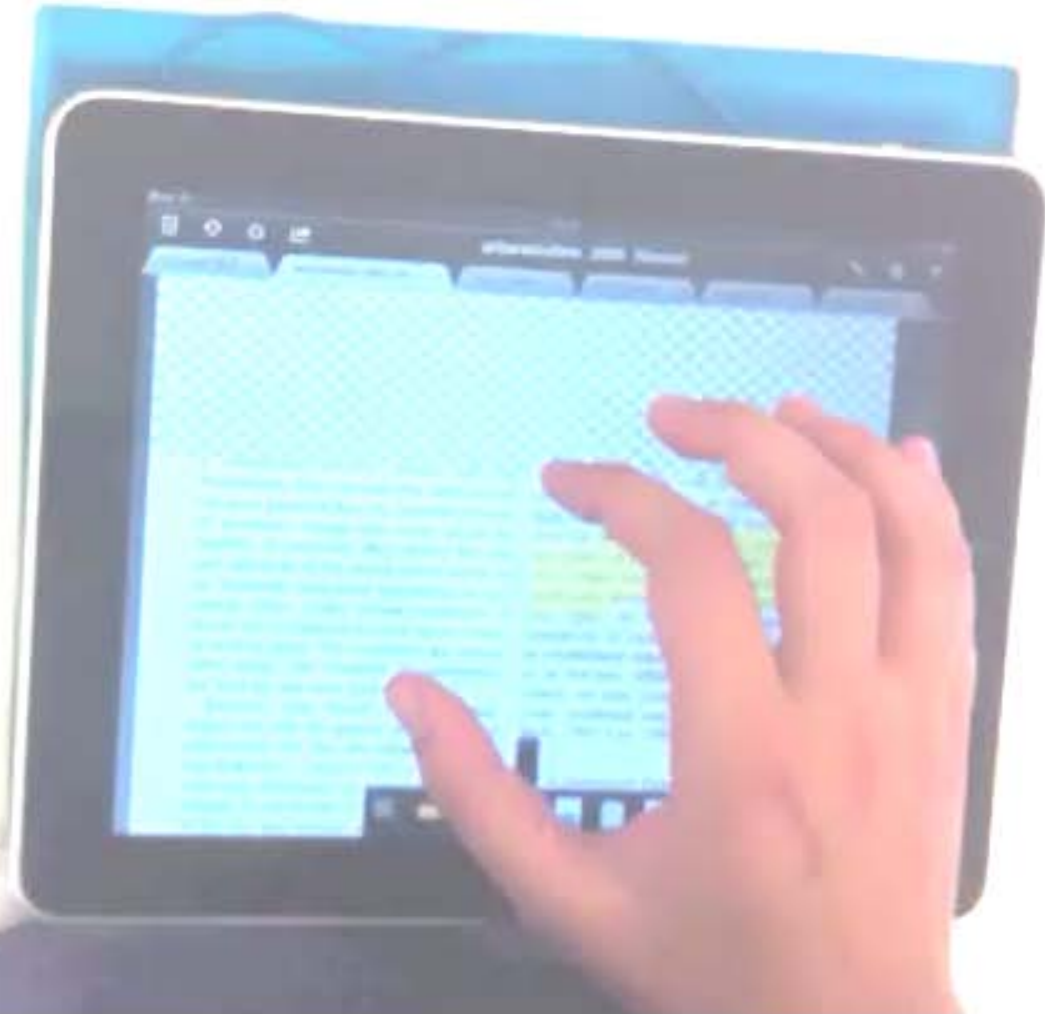# (Re)Defining Usability Heuristics

UseCV – Research Group on HCI

Escuela de Ingeniería Informática

Pontificia Universidad Católica de Valparaíso, Chile

Cristian Rusu, Silvana Roncagliolo

# Reading Difficulties – can iPads help?

Alma Leora Culén

Institute for Informatics
University of Oslo, Norway
almira@ifi.uio.no

AT systems are often complex, expensive and not easy to use

FroggyJump

Cut the…Lite

Factors influencing adoption of AT are many. Some important ones are socio-cultural, economic, technical, environmental etc. For children, an important factor is self-esteam . Reading disorders are invisible, hiding them therefor more important
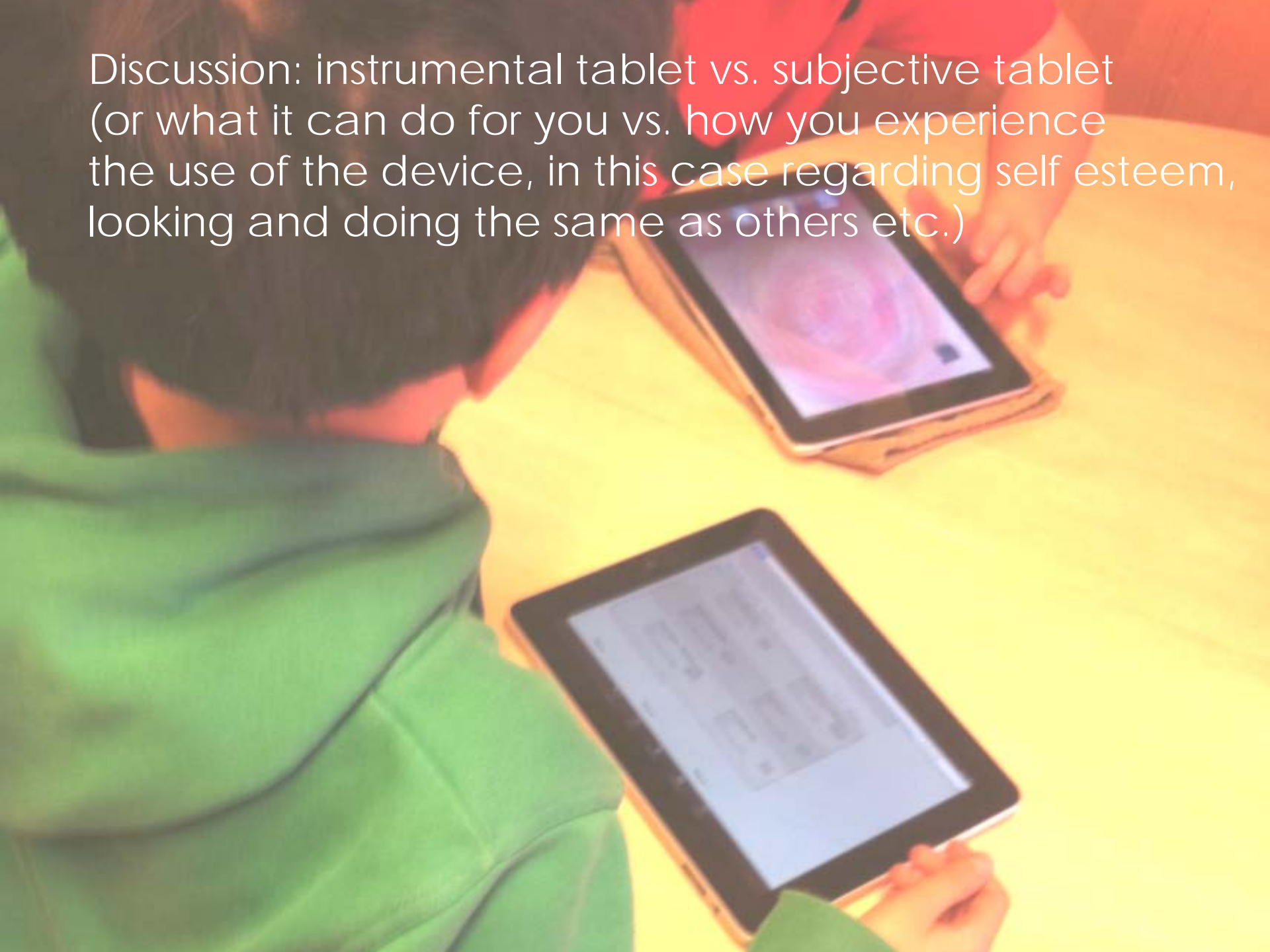
Can molibe technology such as tablets and phones, help?

Obvious help to some on iPad: enlarging the text, text to speach
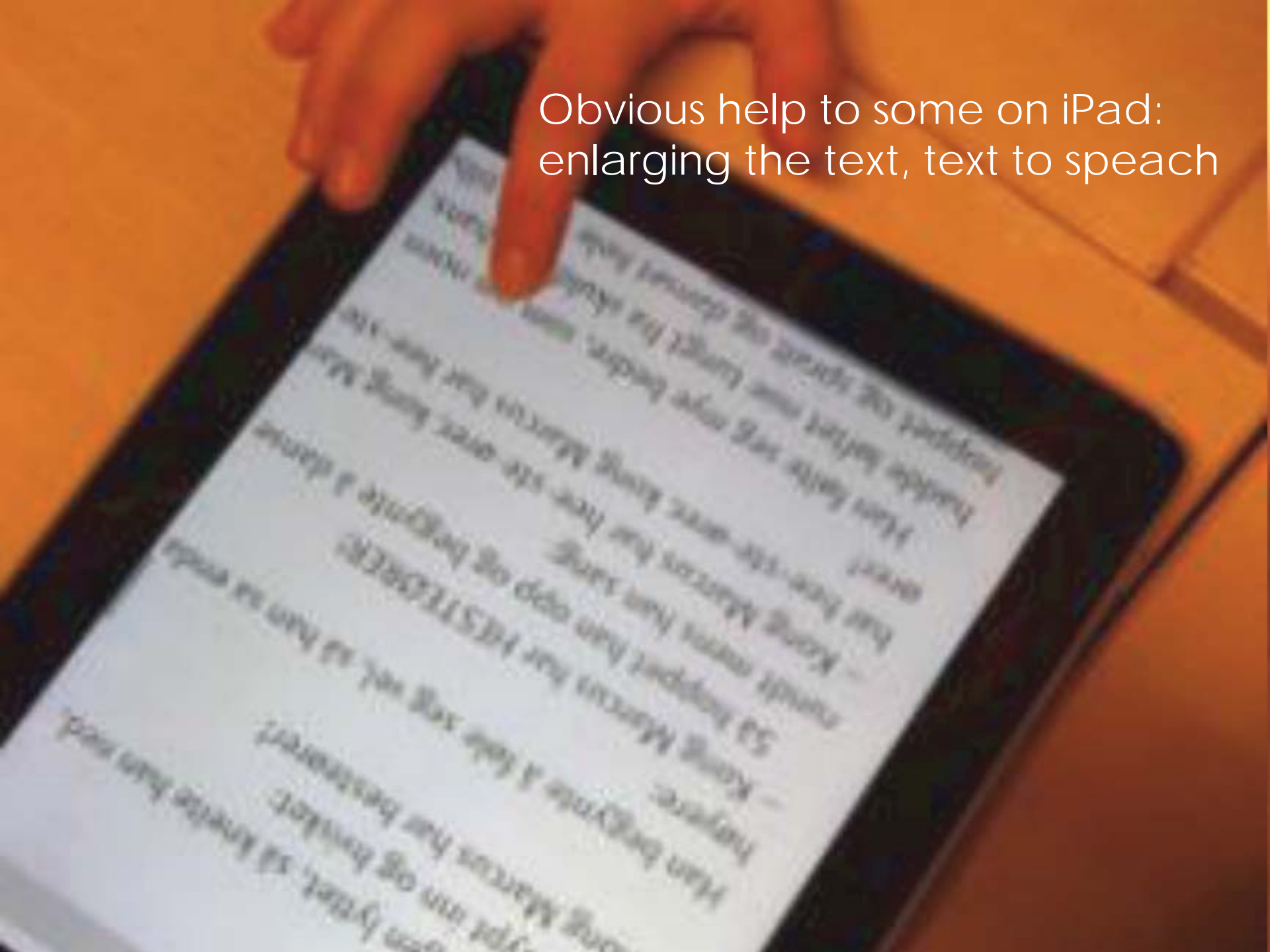
Discussion: instrumental tablet vs. subjective tablet (or what it can do for you vs. how you experience the use of the device, in this case regarding self esteem, looking and doing the same as others etc.)

Discussion: gap between research findings on assistive technology in education and policy

Mary

Observing Mary in smaller groups was a challenge: "If I let you do that, then I for sure will not make any friends in this class."