

# Evaluation of accessibility testing methods: Which methods uncover what type of problems?

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# Overview

- ▶ Background: usable and technical accessibility
- ▶ Methods for testing accessibility
- ▶ Methods and procedure in our study
- ▶ Results
- ▶ Conclusion and future work



# Background: usable accessibility and technical accessibility

- ▶ A universally designed solution needs to be compatible with assistive technology (AT) **and** usable by as wide a range of people as possible.
- ▶ *Technical accessibility* refers to whether a solution is compatible with AT and follows guidelines for accessibility (WCAG).
- ▶ *Usable accessibility* is how usable a solution is for all people, including people with impairments.
- ▶ Fuzzy line between the these two categories

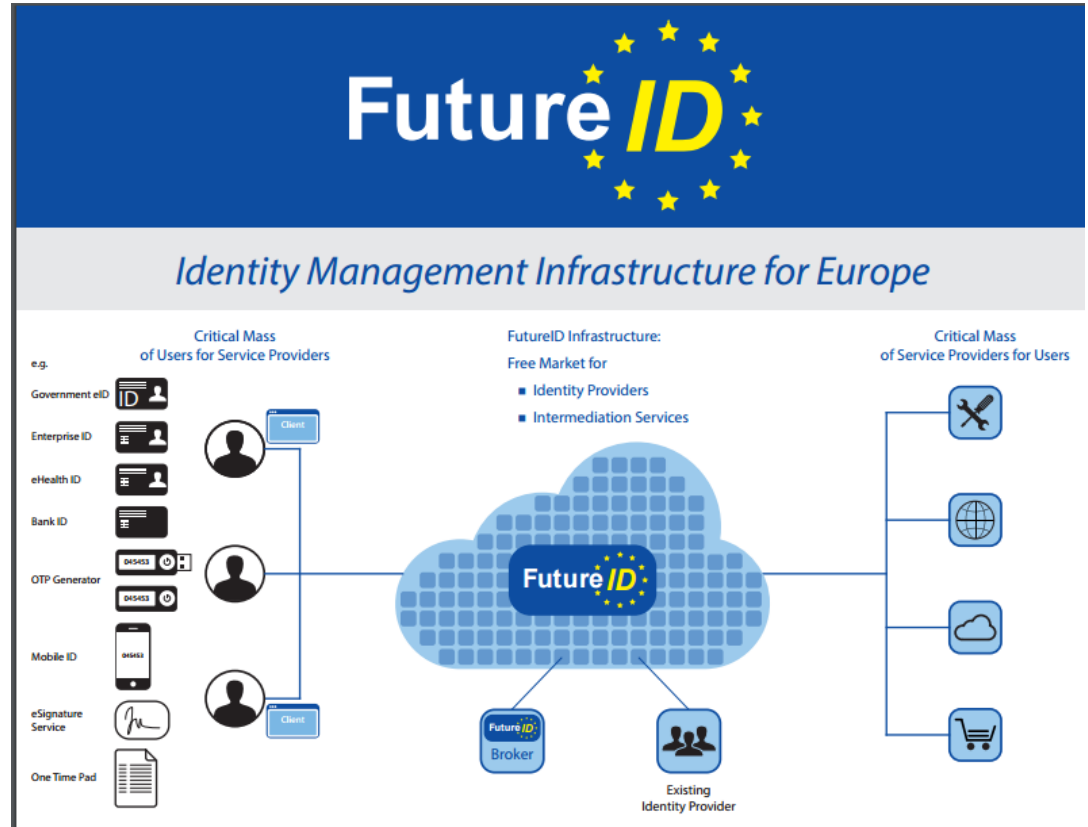
# Methods for testing accessibility

- ▶ Simulation kit
  - ▶ Testing using automatic or semi-automatic tools
  - ▶ Expert testing with guidelines/ heuristics
  - ▶ Testing with diverse users
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- ▶ Most methods address both technical and usable accessibility, but emphasis differ
  - ▶ Methods cover different types of impairments

# We were going to evaluate an e-ID solution

An authentication process using a software certificate or an ID card with a card reader.

Java client and a web front-end.



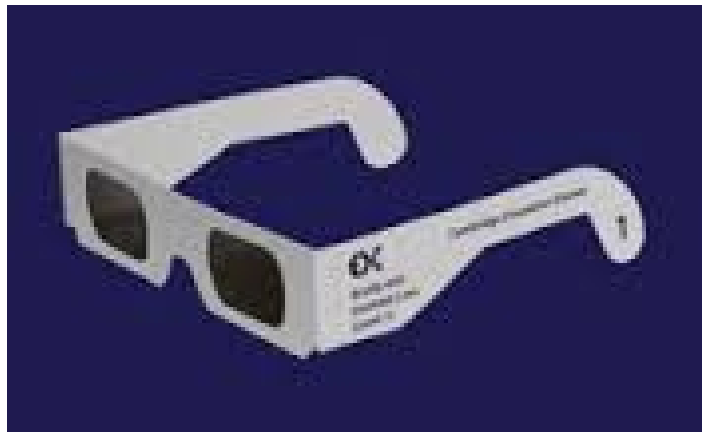
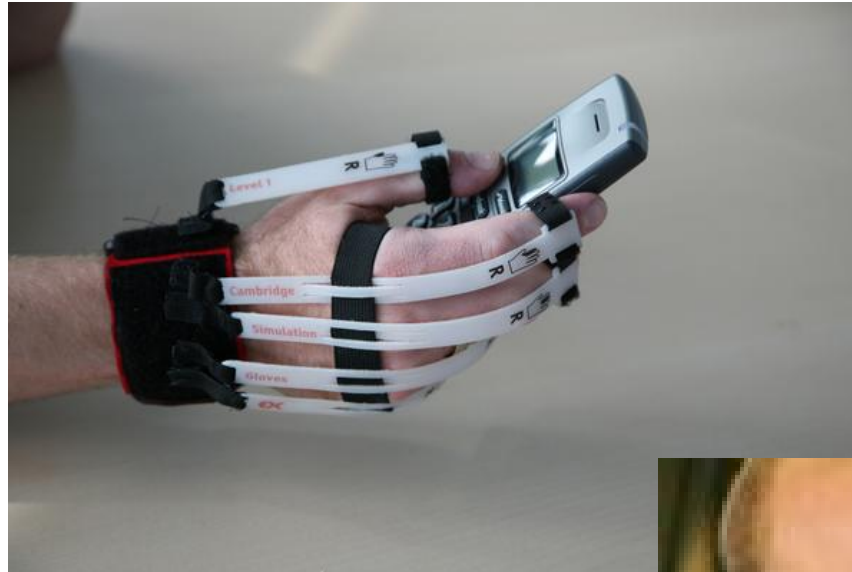
# Testing task scenarios

no	description
1	Login with a invalid digital certificate
2	Login with a valid digital certificate
3	Login with invalid smart card
4	Login with valid smart card, but incorrect PIN
5	Login with valid smart card and correct PIN

# Methods in our study

Method	Type of impairments
Gloves and glasses (Simulation kit)	<ul style="list-style-type: none"><li>– Reduced dexterity</li><li>– Reduced vision</li></ul>
VATLab (testing tool / guidelines)	<ul style="list-style-type: none"><li>– Blindness</li><li>– Light sensitivity</li></ul>
Persona testing (expert testing)	<ul style="list-style-type: none"><li>– Dyslexia</li><li>– Age related impairments</li></ul>
Manual WCAG eval. (conformance check)	<ul style="list-style-type: none"><li>– Multiple impairments</li></ul>

# Cambridge simulation gloves and glasses

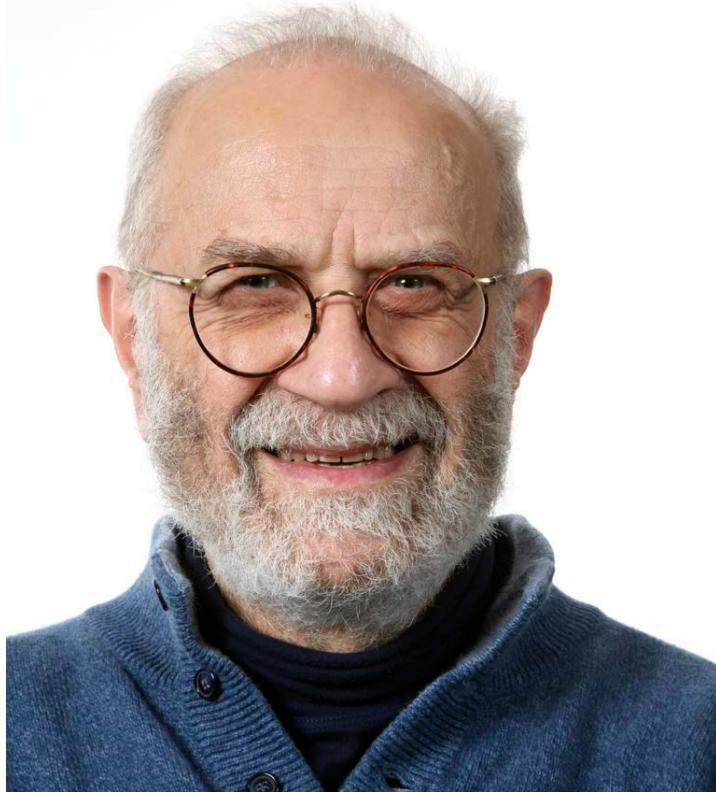






# Persona testing: focus on cognitive issues

**Professor Friedhelm Krüger**



Age related  
impairments



**Jose Salazar**



Dyslexia

# VATLab – Virtual Assistive Technology Lab – Screen reader testing

## Screen readers

- ▶ SuperNova
- ▶ NVDA

## Web browsers

- ▶ Internet Explorer
- ▶ Chrome
- ▶ Firefox
- ▶ Opera



## Screen reader testing guideline / heuristics

### 9.3 Fremgangsmåte

Alle skjermlesere har sin egen måte å navigere og betjene websider på. Ettersom man blir mer erfaren i testing med skjermlesere tillegges man seg vaner og måter å løse problemer på som er mer effektive. Imidlertid kan det være lurt å starte med å gå helt systematisk til verks.

Ved å starte øverst på hver side og bevege seg nedover, for så å sjekke hvert element vil man ganske raskt få en oversikt over om skjermleseren gir brukeren tilstrekkelig med informasjon om de enkelte elementene – altså om de er riktig semantisk oppmerket, og f.eks. om de har gode tekstlige alternativer for bilder.

Det er også andre ting som er viktige å undersøke. Elementene på en webside står sjelden helt for seg selv, og det er viktig å se om rekkefølge og sammenheng er fornuftig. Mange elementer kan også interageres med, og her er det viktig å sjekke at også dette kan gjøres ved hjelp av skjermleser og tastatur.

Vi vil her gå gjennom noen av de vanligste elementtypene, og nevne noen av de viktigste tingene å se etter for hver type element. Deretter vil vi gi noen tips for hvordan man kan undersøke om elementer kan betjenes, og om rekkefølgen av informasjonen på websiden er hensiktsmessig.

### 9.4 Viktige elementtyper å sjekke

#### Lenker

- Forteller skjermleseren at det er en lenke?
- Er det mulig å forstå hvor lenken fører til uten å kjenne konteksten?
- Hvis lenken åpner et nytt vindu – får man denne informasjonen opplest?
- Burde dette egentlig være en knapp – utfra den visuelle presentasjonen?

#### Overskrifter

- Forteller skjermleseren at det er en overskrift?
- Står nivået på overskriften i forhold til den visuelle presentasjonen?

#### Bilder

Online: (in Norwegian) chapt. 9:  
<http://www.iktforalle.no/virtuell-hjelpemiddellab/veileder.html>

# The VATLab start screen

Convention on the Rights of P...

www.un.org/disabilities/convention

## CONVENTION on the RIGHTS of PERSONS with DISABILITIES

Main Page

About the Convention

Opening for signature

Media Resources

United Nations Secretariat

UN System Links

Note on Accessibility

Site Map

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### Convention on the Rights of Disabilities

#### Preamble

The States Parties to the present Conven...

- Recalling the principles proclaimed in the Declaration of the United Nations which recognize the inherent the equal and inalienable rights of all family as the foundation of freedom, world,
- Recognizing that the United Nations, Declaration of Human Rights and in the Covenants on Human Rights, has proclaimed that everyone is entitled to all the rights therein, without distinction of any kind,
- Reaffirming the universality, indivisibility, interdependence and interrelatedness of all human rights and fundamental freedoms and the need for persons with disabilities to be guaranteed their full enjoyment without discrimination,
- Recalling the International Covenant on Economic, Social and Cultural Rights, the International Covenant on Civil and Political Rights, the

### Velkommen til NVDA

Velkommen til NVDA!

De fleste kommandoene for å styre NVDA gis ved å berøre NVDA-tasten samtidig som andre taster. Som standard kan begge insert-knappene brukes som NVDA-tast. Du kan konfigurere NVDA til å bruke CapsLock som NVDA-tast. Trykk NVDA+n når som helst for å åpne NVDA-menyen. Fra denne menyen kan du konfigurere NVDA, få hjelp, samt finne andre NVDA-funksjoner.

Velg

- Bruk CapsLock som NVDA-tast
- Automatisk start NVDA etter innlogging til Windows
- Vis denne dialogen når NVDA starter

OK

# Manual WCAG 2.0 evaluation

Principles	Guidelines	Level A	Level AA	Level AAA
1. Perceivable	1.1 Text Alternatives	1.1.1		
	1.2 Time-based Media	1.2.1 – 1.2.3	1.2.4 – 1.2.5	1.2.6 – 1.2.9
	1.3 Adaptable	1.3.1 – 1.3.3		
	1.4 Distinguishable	1.4.1 – 1.4.2	1.4.3 – 1.4.5	1.4.6 – 1.4.9
2. Operable	2.1 Keyboard Accessible	2.1.1 – 2.1.2		2.1.3
	2.2 Enough Time	2.2.1 – 2.2.2		2.2.3 – 2.2.5
	2.3 Seizures	2.3.1		2.3.2
	2.4 Navigable	2.4.1 – 2.4.4	2.4.5 – 2.4.7	2.4.8 – 2.4.10
3. Understandable	3.1 Readable	3.1.1	3.1.2	3.1.3 – 3.1.6
	3.2 Predictable	3.2.1 – 3.2.2	3.2.3 – 3.2.4	3.2.5
	3.3 Input Assistance	3.3.1 – 3.3.2	3.3.3 – 3.3.4	3.3.5 – 3.3.6
4. Robust	4.1 Compatible	4.1.1 – 4.1.2		

# Testing procedure

- ▶ The 5 test scenarios were tested in same order each time
- ▶ Each test scenario was performed using the 4 methods.
- ▶ 2 testers for each method
- ▶ testers had varying degree of accessibility knowledge (from novice to experienced)
- ▶ One note-taker for each test

# Results (1): overview

- ▶ 425 issues were reported
- ▶ 213 distinct issues  
(even though we only tested a small bit of functionality)
- ▶ each method uncovered issues spread evenly between the different impairments.  
(less so for the reduced dexterity simulation)

## Results (2): number of issues found

Method	No of issues	% of total	Critical %	Confusing %
Simulation kit	58	27	24	33
VATLab	62	29	<b>76</b>	16
Persona testing	61	29	46	<b>75</b>
WCAG	32	15	22	22

# Results (3): Unique critical and confusing issues

Method	Critical %	Confusing %
Simulation kit	12 %	24 %
VATLab	<b>61 %</b>	12 %
Persona testing	25 %	<b>59 %</b>
WCAG	2 %	5 %



## Results (4): Issue coverage

Method	Total coverage
Simulation kit	42 %
VATLab	45 %
Persona testing	44 %
WCAG	23 %

# Conclusion and future work

- ▶ No single method that works best for finding both critical and confusing issues
- ▶ Include both methods that focuses on
  - technical accessibility and
  - usable accessibility
- ▶ All methods uncovered less than 50% of issues
- ▶ Future:
  - compare with user testing
  - improved experimental set-up

# Thank you for your attention!

Comments?

Questions?

Please contact

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