

Inclusive Identity Management – Usability perspectives on IDM

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e-Me

**e-Me – inclusive identity management
in new social media**

**The e-Me project is funded by the VERDIKT
program, the Research Council of Norway.**

Content

- ▶ What is inclusive design?
- ▶ Motivation for inclusive IDM
- ▶ Existing knowledge and examples
- ▶ A prototype
- ▶ Summary

Inclusive design and related terms

- ▶ Many related terms:
 - design for all,
 - universal access,
 - universal usability,
 - accessible design & sensitive inclusive design etc.
- ▶ Norwegian legislation uses the term “Universal design”
- ▶ Universal design (uu) - The design of products and environments to be usable by all people, to the greatest extent possible, without adaptation or specialized design.
- ▶ uu - Denotes the process and the resulting design

E-inclusion?

- ▶ E-inclusion ('e' standing for electronic) will prevent 'digital exclusion' by
 - ensuring that all information and communication technology (ICTs) is accessible for all
- ▶ Why important? precondition for democracy, education, work, participation in working life and in social life.
- ▶ E-inclusion also means to create new 'digital opportunities' for the inclusion of socially disadvantaged people:
 - ensure equal access to knowledge and information resources (vital for democracy and participation)
 - offer new job opportunities (empowerment through ICT)
 - overcoming barriers to mobility and geographic distance

Political pressure and legislation

Broad political awareness and initiatives in EU:

- ▶ The "i2010 – A European Information Society for growth and employment" shall foster inclusion, better public services and quality of life through the use of ICT.
 - E-inclusion is one of the main priorities.
- ▶ EU has signed the UN Convention on the Rights of Persons with Disabilities
 - This makes an additional pressure to bring EU legislation in line with the demands of the Convention, including the Article on universal design of ICT.
- ▶ Several EU Member States, like Britain, Italy, France and Norway already have clauses in their national legislation to promote universal design of ICT.

Universal design is about accommodating diversity in demographics, situations and devices



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Important goals of universal design in ICT

- ▶ Increasing the usability and accessibility for all users
 - Interaction style should depend on the users sensory, motor and cognitive abilities, situations and devices.
 - using different modalities, such as: text, pictures, illustrations, symbols, sounds, voice, vibration
 - make sure that it can be used together with various types of assistive technology - by following standards.
 - E.g. Braille equipment, text to speech, spell control, foot pedals etc.
- ▶ A person in a constraining situation may produce similar requirements to a system as an impaired person....

Multimodal requirements (1)

Constraining situation	Corresponding impairment	ICT requirement	Alternative designs
People in situation where eyes are busy	Visually impaired	Operable without vision	Give info in haptic or sound format
People in a very noisy environment	Hearing impaired	Operable without hearing	Give info in visual or haptic form
People not speaking current language	Reading impaired	Operable without reading	Use audio output, illustrations etc

Multimodal requirements (2)

Constraining situation	Corresponding impairment	ICT requirement	Alternative designs
People who are distracted or stressed,	Reduced cognitive abilities: <ul style="list-style-type: none"> - problem solving - attention - memory - Reading/ writing 	Operable with limited cognition	Use clear and simple design. No excess information. Reduce number of choices. Explain same thing in different modalities. Follow standards

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Flexibility

- ▶ Flexibility in interaction modality and interaction style gives more people access in more situations

but

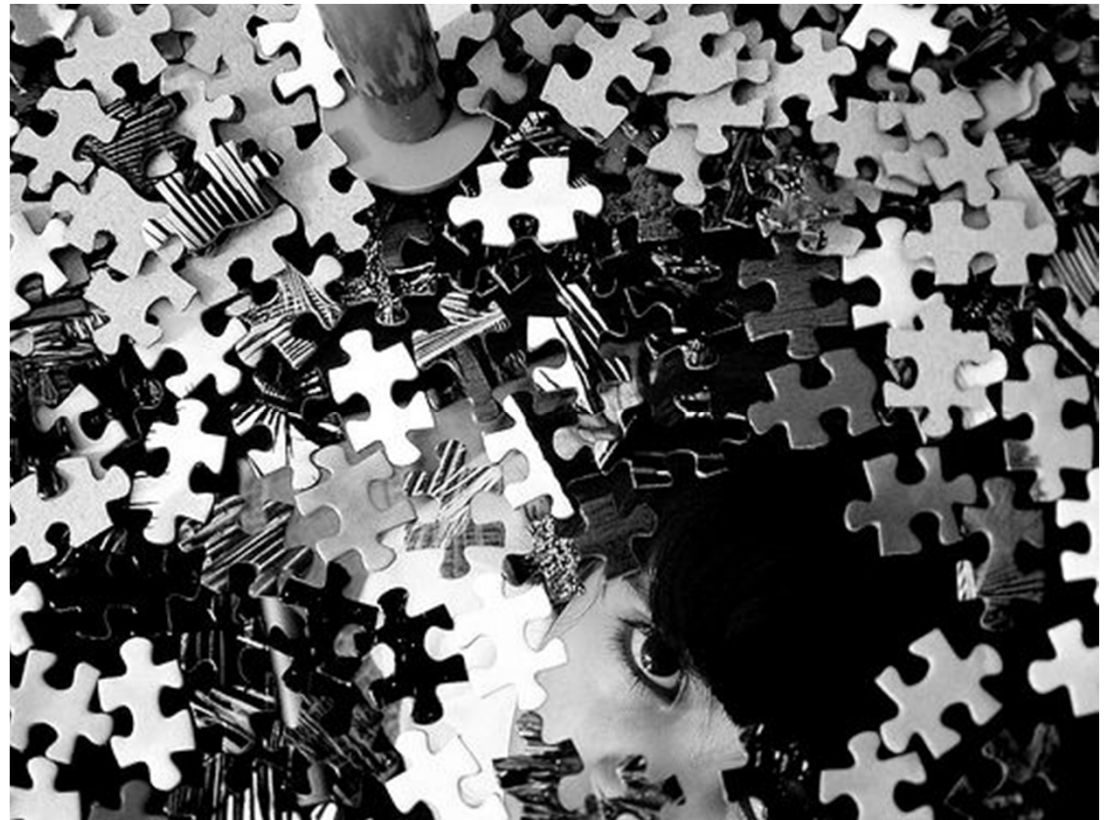
- ▶ This flexibility requires
 - more functionality and more choices



- ▶ Leads to

Complexity

- ▶ Inefficient for all
and
- ▶ a barrier for
people with
cognitive
impairments



Adaptation and personalisation

- ▶ Need for personalisation and adaptation according to users current abilities and situation
- ▶ Challenges
 - People who needs personalisation are not able to do it on their own.
 - Personalisation should not replace good design
 - Personalisation in itself adds to complexity
- ▶ Possible solutions
 - Establish profiles with as little as possible effort from the user
 - (Semi) automatic profiling by testing and monitoring the users abilities and situations?
 - Focus on cognitive abilities

Inclusive identity management

- ▶ Inclusive identity management becomes essential to e-inclusion

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Existing knowledge

Usability and accessibility of security mechanisms and IDM technology

- ▶ Low usability of *IDM-systems* has been found to be a major source of flaw and risk
- ▶ Users seek to get things done with the least possible effort
- ▶ Current IDM systems are inaccessible to many user groups, in particular to elderly and users with disabilities
- ▶ Users use weak passwords
- ▶ Many user groups have problems with CAPTHCA's

Something the user has

- ▶ Smart card
- ▶ Code card
- ▶ Hardware code generator
- ▶ SMS to your mobile (eg. Scandiabanken)

Challenges

- ▶ physical ability to wipe a card, to see/read and understand a code or a password



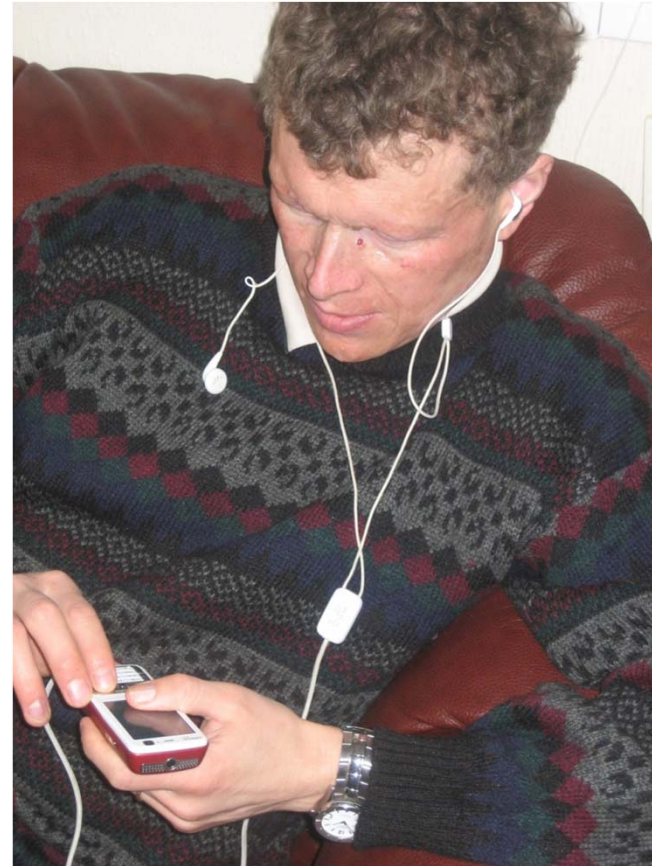
Something the user has (cont 1) Accessible security tokens

- ▶ Hardware code generator (DNB Nor provides with big display and audio)



1. What the user has (cont. 2) accessible security tokens

- ▶ SMS to mobile phone – text to speech software on the mobile



Something the user knows

- ▶ pin codes
- ▶ passwords
- ▶ Captchas

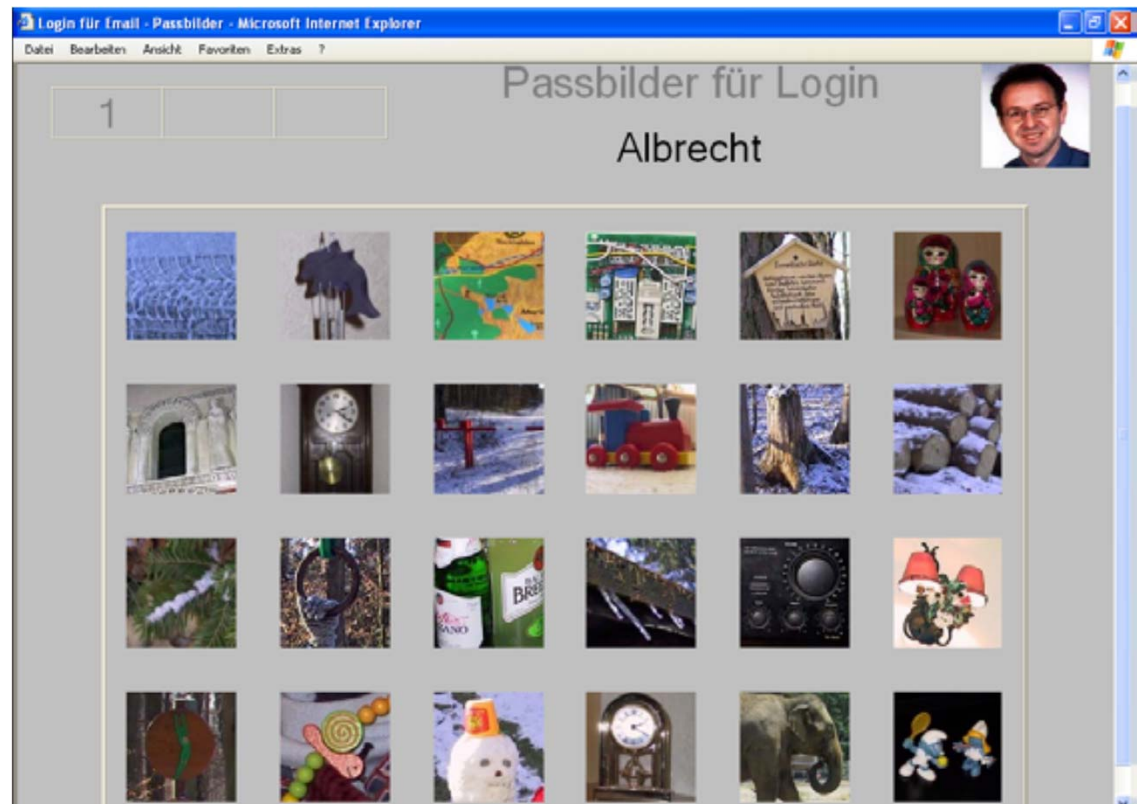
- ▶ Challenges
 - dyscalculia
 - memory
 - cognition

Something the user knows (cont. 1)

21

Accessible password requirements?

- ▶ Image based
"pin"s



Something the user knows (cont. 2)

Accessible password requirements?

- ▶ Audio based captchas

Security Check

Enter **both** words below, separated by a space.

Can't read this? Try another.
Try an audio captcha

Drive *Jean*

Text in the box:

[◀ Back](#) [Sign Up](#)

Something the user knows (cont. 3)

- ▶ Choosing a word relating to several images:
- ▶ <http://www.captcha.net>

The screenshot shows a Mozilla Firefox browser window titled "ESP-PIX - Mozilla Firefox". The address bar contains the URL <http://www.captcha.net/cgi-bin/esp-pix?another=Take+anoth>. The browser's menu bar includes File, Edit, View, History, Bookmarks, Tools, and Help. The toolbar shows navigation buttons and a search engine set to Google. The browser's address bar and tab bar are visible, with several tabs open, including "ESP-PIX".

The main content area displays a CAPTCHA challenge from "The CAPTCHA project". It features four images arranged in a 2x2 grid:

- Top-left: Four playing cards (clubs, hearts, diamonds, spades) with the word "Bridge" written in blue and red.
- Top-right: A yellow birthday invitation for Ava's 5th birthday party on Saturday, March 16, 2002, at 12-2, at 1498 Summit Road, Berkeley, CA 94708. The invitation includes a drawing of a girl and a dog.
- Bottom-left: A green credit card with the number 3712 9500.
- Bottom-right: A photograph of a brown dog wearing a red scarf, with the text "Don't sit under the weather with anybody else but me!" below it.

To the right of the images is a text prompt: "Choose a word that relates to all the images." Below this prompt is a dropdown menu with a blue arrow pointing down. The dropdown menu is open, showing a list of words: card, bridge, bulb, butterfly, cake, camera, cat, cheese, church, clock, coin, cow, cup, dog, doll, drop, egg, elephant, finger, fish. The word "card" is highlighted in blue. To the left of the dropdown menu, a tip reads: "TIP: You a word a arrow to t letter of down".

At the bottom of the CAPTCHA challenge area, there is a copyright notice: "© 2004 Carnegie Mellon University, all rights reserved."

Something the user is or does

Common biometrics

- Fingerprints
- Iris recognition
- Signature
- Speech/voice recognition
- Way of walking

Other methods:

- Hand geometry
- Vein geometry
- Facial recognition



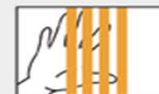
fingerprint recognition;



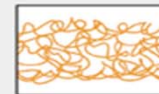
iris recognition;



face recognition;



hand geometry recognition;



vein recognition;



voice recognition; and



dynamic signature recognition.

Something the user is or does (cont.)

- ▶ Challenges:
- ▶ Not all people have the same physical features.
- ▶ The physical feature may be temporary or permanently damaged by disease or accident
- ▶ Biometrics usually have higher failure rates with the very old. As people get older, ageing processes tend to degrade biometrics.
- ▶ Inaccuracy:
Sometimes it just fails for no explainable reason

Possible solutions

- ▶ Flexibility of authentication methods
- ▶ Present alternatives

- ▶ Challenge: how can these alternatives be presented in an accessible way?
 - Profiles: creation, storing, management ?
 - Privacy: (the user do not necessarily want the webservice to know about impairments)

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Uu-autentiseringsprosjektet – Prototype I


Storebrand: Forsikring, bank og sparing - storebrand.no - Mozilla Firefox


File Edit View History Bookmarks Tools Help


Person Bedrift og offentlig Om Storebrand In English

storebrand

Søk

Bank 

Sparing 

Forsikring 

Logg inn

- NettBank
- Min økonomi
- Ansatteportalen
- NettBank Bedrift
- Bedriftsportalen

Kontakt oss

Meld skade

Sperre kort

Verktøy

- Abonner på nyheter
- Alle våre produkter
- Flere verktøy

Samfunnsansvar

Best i pristest

7 av 10 sparer på å flytte forsikringene til oss

[Sjekk din pris og kjøp her](#)

Slik påvirkes du av finanskrisen

Det siste året har vært svært turbulent i finansmarkedene. Storebrand gir deg en oversikt over hvordan de ulike spareordningene påvirkes.

[Se våre råd om de ulike spareformene](#)

Rosa sløyfe-aksjonen 2008

Som hovedsamarbeidspartner til Kreftforeningen støtter Storebrand opp om Rosa sløyfe-aksjonen 2008.

[Les mer om aksjonen](#)

Spar i IPS - få lavere skatt

Nå kan du igjen spare til egen pensjon med skattefordeler. Spar inntil 15 000 kroner i året, og få inntil 4 200 kroner i lavere skatt.

[start sparingen til en bedre alder dom](#)

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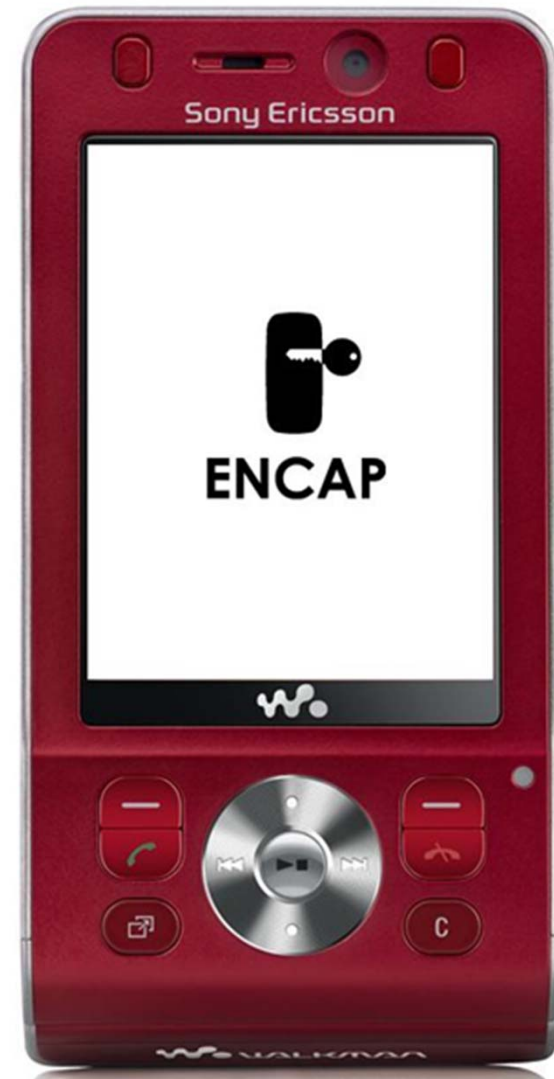
Prototype II

storebrand

NettBank - Logg inn

Brukernavn

Passord



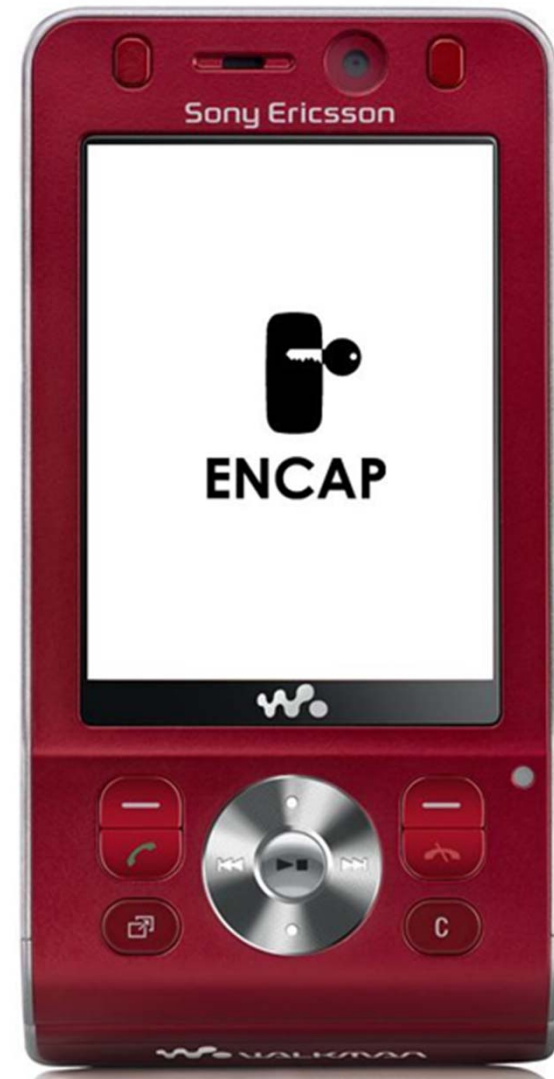
Prototype II

storebrand

NettBank - Logg inn

Brukernavn

Passord



Prototype III

storebrand

NettBank - Logg inn

Brukernavn

Passord



Prototype IV

storebrand

NettBank - Logg inn

Brukernavn

Passord

Tast PIN-kode
(4 siffer)



Prototype V

storebrand

Tast inn kode fra mobiltelefonen:

Utfør Avbryt Hjelp

Sikkerhetskoden:
9 3 2 6 6 9



Prototype VI

storebrand

Tast inn kode fra mobiltelefonen:

Utfør Avbryt Hjelp



Taleprototype VII

NettBank - Storebrand Bank ASA - Mozilla Firefox

File Edit View History Bookmarks Tools Help

Storebrand: Forsikring, bank og ... NettBank - Storebrand Bank...

? Hjelp Ring meg Logg ut

storebrand

NettBank Bestill konto og kort Lånesøknad Aksjehandel MobilBank Arkiv og post

Sverre
22.10.2008 11:52

Totaloversikt

Du kan endre totaloversikten under **Eget oppsett** [Skriv ut](#)

Oppsummering

Disponibelt	677,43	Sum trukket kreditt	0,00	Sum lån	0,00
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Mine konti

Kontonavn	Kontonummer	Disponibelt	Saldo	Velg funksjon
Storebrandkonto	9100.15.1	677,43	677,43	
Sparekonto	9100.15.1	000,00	000,00	
Sum disponibelt		677,43		

For å lese pdf-dokumenter, må du ha Adobe Reader. Dette programmet kan du laste ned gratis her.

Get ADOBE READER

Betalinger de neste 90 dager

Forfallsdato	Mottaker	Fra konto	Beløp	Velg funksjon
25.10.2008	LIER KOMMUNE 7874.05.88000	Storebrandkonto 9100.1	1 922,00	
Sum			1 922,00	

Prototype evaluation

- ▶ We tested with 5 and 5 visually impaired dyslexics - these are the results:
- ▶ Well received
- ▶ Need for improvements
 - Installation and setup requires thorough preparation and test
 - voice quality,
 - user dialog and prompts can be improved
- ▶ user wanted to flexibility
 - reading speed
 - grouping of numbers - two and two or one by one.
 - Pause, repeat, volume
- ▶ Conclusion: an improved solution could increase the accessibility for visually impaired and people with dyslexia

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Summary – need for alternatives

Metode	Kjennetegn ,utfordring	Syns- hemmede	Hørsels- hemmede	Bevegelses- hemmede	Kognitiv funksjons- hemming	Dysleksi og dyskalkuli
Passord	Tekstbasert, oftest visuelt	●	●	✗	✗	✗
Tekst captcha	Vanskelig tekst	✗	●	✗	✗	✗
Smart kort	Lite kort med chip eller stripe.	✗	●	✗	●	●
Pin koder	Tallbasert, oftest visuelt	✗	●	✗	✗	✗
Fingeravtrykk	Må kunne plassere fingeren riktig	✗	●	✗	●	●
Stemme- gjennkjenning	Mikrofon, kontekst	●	✗	●	●	●

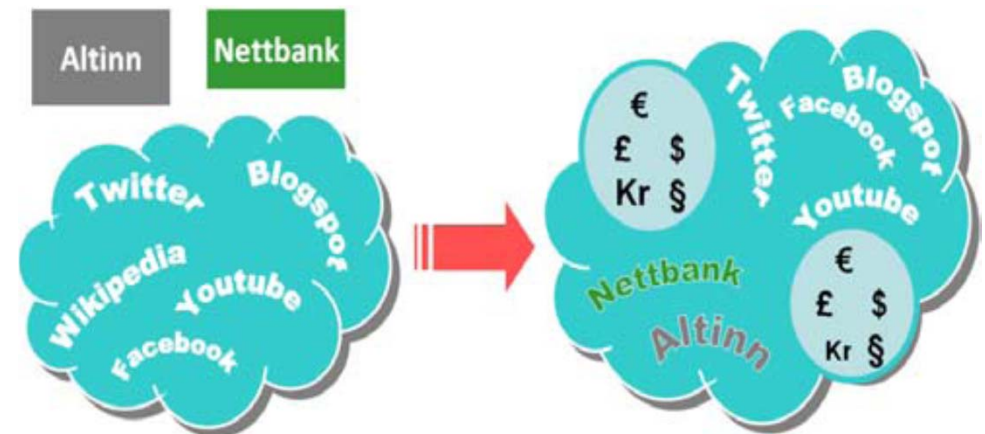
Summary

- ▶ Offer alternatives
- ▶ Multimodality
- ▶ No single solution will suit everybody – need alternatives
- ▶ Need profiles in order to do personalization and adaptation
- ▶ Profiles have privacy challenges.



New challenges

- ▶ Increasing use of Social media
- ▶ Increasing no of services
- ▶ Integration of services with different use context and thus security/privacy requirements
 - Private,
 - Commercial
 - Public
- ▶ Real life dynamics vs. virtual life



Challenges of user security research

- ▶ Privacy/security is rarely a primary goal for users:
 - Most users do not care about privacy/security until it is broken.
 - a study itself may introduce bias by having the participant focus more on security than outside an experimental setting.
- ▶ Qualitative methods such as observation and interviews have been used successfully in a number of studies but have limitations:
 - ethical issues in unobtrusive/covert real life studies
 - significant inconsistency with what people say they do and what they actually do.
- ▶ Lab experiments has its limitations:
 - when using dummy data users do not act to protect their data as if it is their own.
 - huge privacy and ethical challenges of having users using their own data

Thank you for your attention!

- ▶ Questions?
- ▶ Contact information:
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 - Phone: +47 22 85 25 00

History – The three T's

Technology developed for disabled has become mainstream technology:

- ▶ **Telephone:**
The telephone was one of the many devices Bell developed in support of his work with the deaf.
- ▶ **Typewriter:**
the first typewriter was built by Pellegrino Turri in 1808 for his blind friend Countess Carolina Fantoni da Fivizzano. He wanted her to be able to write love letters legibly.
- ▶ **Transistor:**
Bell Labs scientists developed the transistor in order to make smaller and less power-consuming hearing aids. This invention became the primary technology responsible for fueling a revolution in the telecommunications industry - and this continues today.

More examples: <http://www.icdri.org/technology/ecceff.htm>