

Inclusive Identity Management in New Social Media

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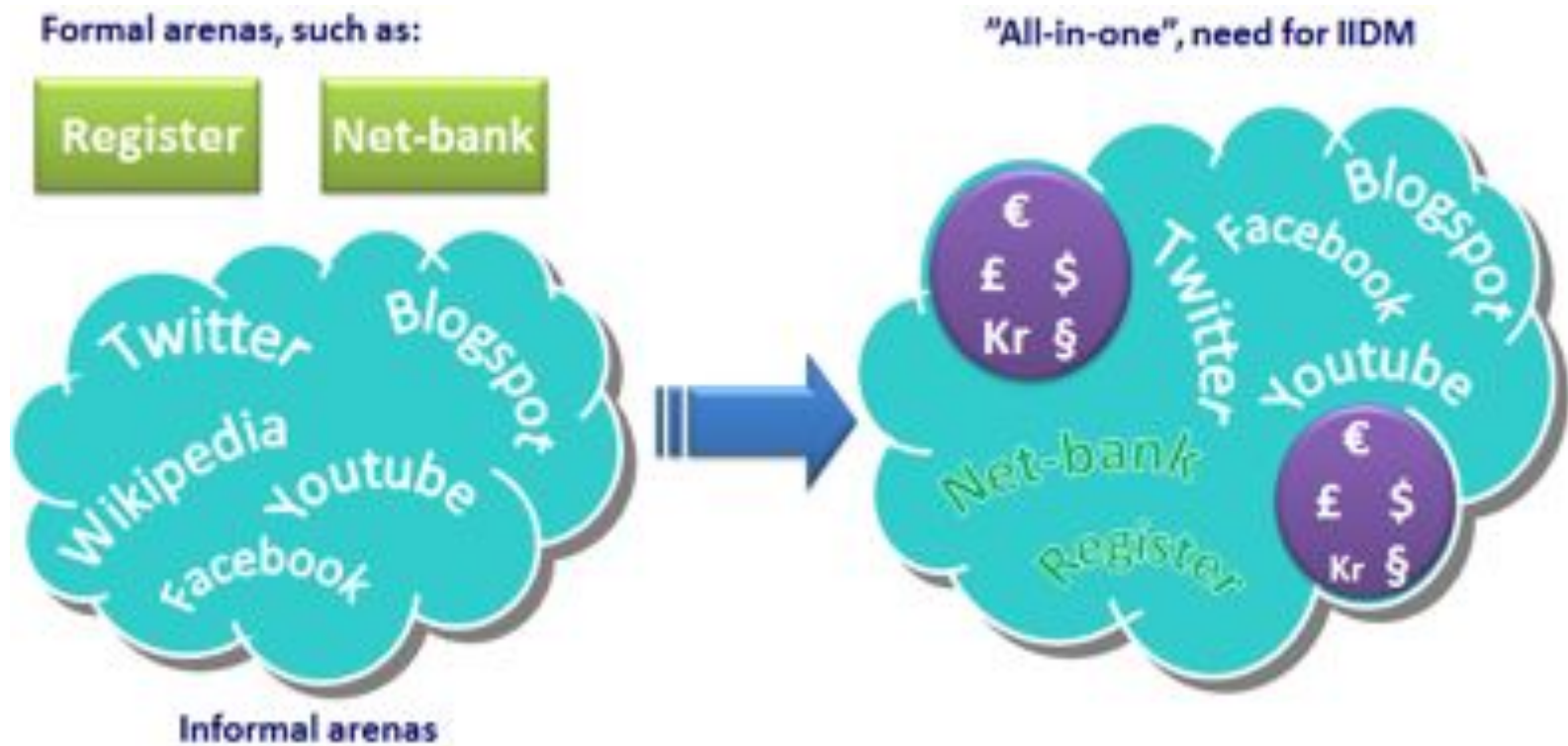
September 5th-9th, 2011, Trento, Italy

The e-Me-project

- **Inclusive** identity management (IIDM) in new social media.
- Objective: To provide new knowledge that can significantly improve the **usability and accessibility** of identity management (IDM) and authentication mechanisms in new social networks **without compromising privacy, security or offending legal frameworks**.
- In order to use electronic services, user often must be authenticated and their user accounts must be managed. A basic requirement for accessible systems is therefore that IDM-methods can be used by a **broad range of users**, with **different skills/literacy**, **ages**, and **different (dis)abilities**.

What's the challenge?

Convergence: Transformation of social networks into integrated services:



What's the problem?

Identification and authentication mechanisms:



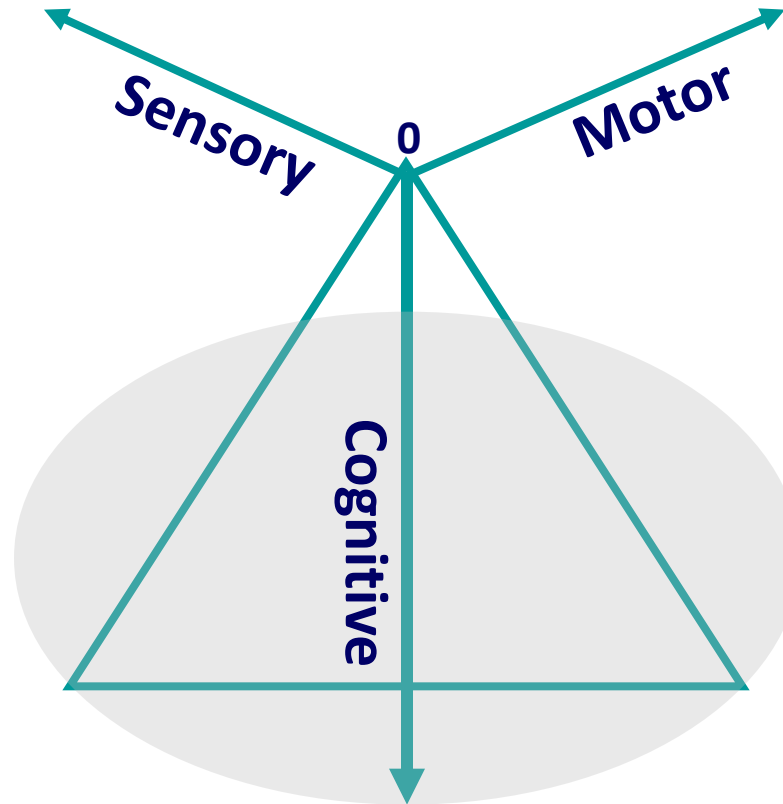
Examples:

- Login procedures requiring passwords can lead to problems for dyslexic people.
- Image authentication such as captcha-code is a barrier for vision-impaired users.

Areas of disability

Vision / blindness
Hearing / deafness
(sight, hearing, smell,
touch, taste and spatial
awareness)

Memory
Concentration
Orientation (time, space)
Learning
Reading/writing
Problem solving / abstract thinking



Low dexterity
Tremor / shivering
Paralysis

**Cognitive disabilities are
«invisible» but very common**

Principles of Universal Design

- Public procurement and anti-discrimination **legislations** lean on principles of Universal Design (or Design-for-All).

- **PRINCIPLE ONE: Equitable Use**

The design is useful and marketable to people with diverse abilities.

Guidelines:

- 1a.** Provide the same means of use for all users: identical whenever possible; equivalent when not.
- 1b.** Avoid segregating or stigmatizing any users.
- 1c.** Provisions for privacy, security, and safety should be equally available to all users.
- 1d.** Make the design appealing to all users.

Principles of Universal Design* (continued)

- **PRINCIPLE TWO: Flexibility in Use**

The design accommodates a wide range of individual preferences and abilities.

Guidelines:

2a. Provide choice in methods of use.

- **PRINCIPLE THREE: Simple and Intuitive Use**

- **PRINCIPLE FOUR: Perceptible Information**

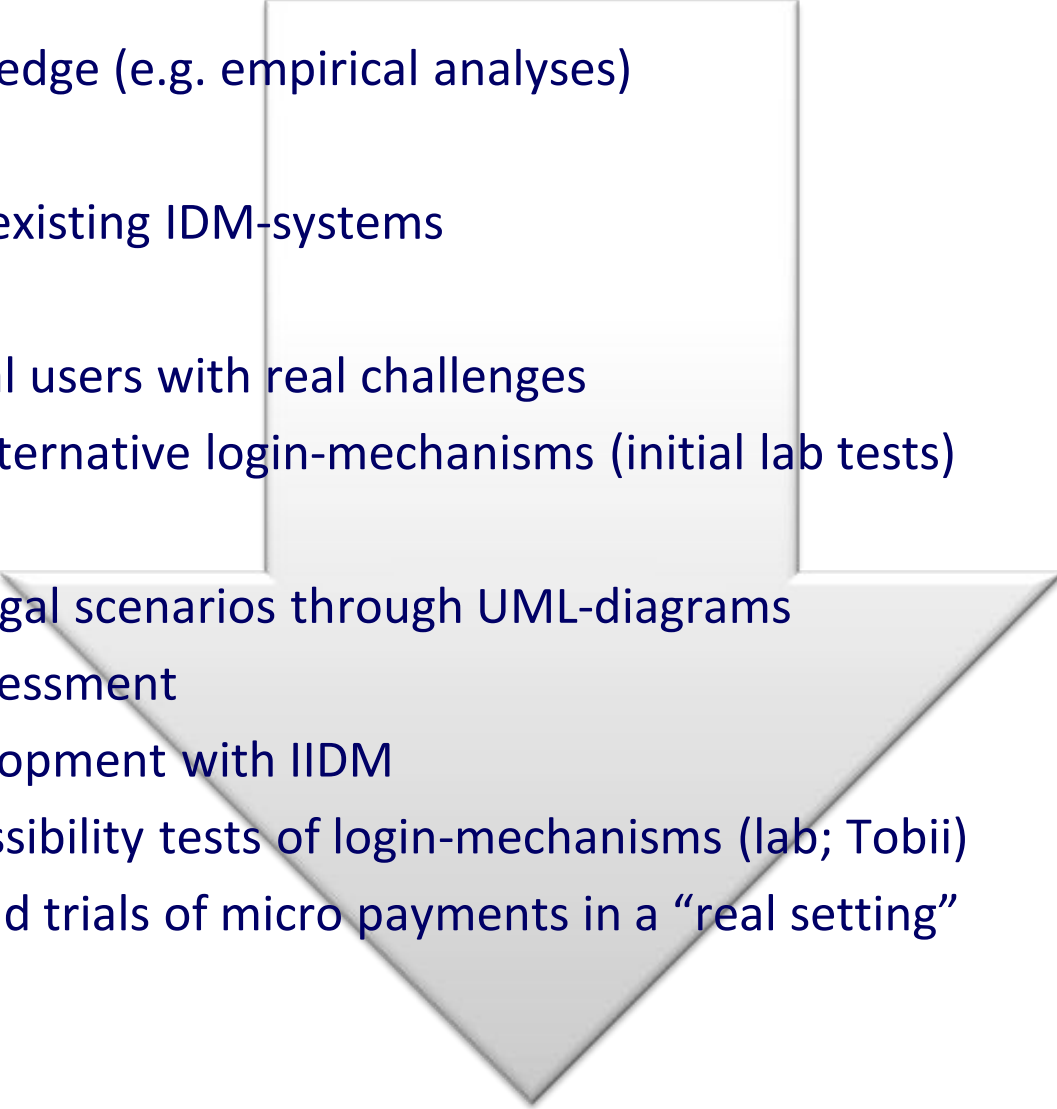
- **PRINCIPLE FIVE: Tolerance for Error**

- **PRINCIPLE SIX: Low Physical Effort**

- **PRINCIPLE SEVEN: Size and Space for Approach and Use**

* http://www.ncsu.edu/www/ncsu/design/sod5/cud/about_ud/udprinciplestext.htm

How are we working?

- 
1. Background knowledge (e.g. empirical analyses)
 2. Hypotheses
 3. Experiments with existing IDM-systems
 4. “Idea” scenarios
 5. Recruitment of real users with real challenges
 6. Development of alternative login-mechanisms (initial lab tests)
 7. “Legal” scenarios
 8. Formalisation of legal scenarios through UML-diagrams
 9. Privacy Impact Assessment
 10. Social media development with IIDM
 11. Usability and accessibility tests of login-mechanisms (lab; Tobii)
 12. “Friends”: Tests and trials of micro payments in a “real setting”

1 (13) Empirical analyses

The Brønnøysund Register Centre is a government body under the Norwegian Ministry of Trade and Industry, and consists of several different national computerised registers with information and key data about e.g.:

- Liabilities and titles in mortgaged movable property
- Almost 400 000 business enterprises
- More than 2 300 000 annual accounts and auditor's reports of limited companies
- Bankruptcies and compulsory liquidations
- Approximately 230 000 marriage settlements

- Altinn.no «all in»
- Brreg.no

Findings (a couple of years ago, and still about the same):

Category	Percentage
Finding the service	27 %
Roles/Rights	12 %
Log in	33 %
Printout	4 %
Attachments	9 %
Fill in / Send in	12 %
Company	1 %
Not Altinn	1 %
Sum	100 %

1 (13) “All in”

The Register of Marriage Settlements registers agreements between spouses regulating their assets/property in a different way than what automatically follows from marriage legislation.

The Register of Company Accounts collects annual accounts, including the auditor's report, from all private and public limited companies, savings banks, mutual insurance companies and petroleum enterprises.

The Register of Private Debt Amnesty registers debt settlement/restructuring negotiations and schemes, and contains copies of all debt settlement agreements that have been entered into.

The Register of Bankruptcies registers estates in bankruptcy, debtors in liquidation and compulsory liquidations. The Register of Bankruptcies also registers persons that have been disqualified from operating a business.

The Register of Business Enterprises registers all Norwegian and foreign business enterprises in Norway.

The EMAS Register registers Norwegian business enterprises that take part in the Eco-Management and Audit Scheme - EMAS - a voluntary scheme for environmental registration of business enterprises in the EU.

The Central Coordinating Register for Legal Entities registers basic data about legal entities to coordinate information on business and industry that resides in various public registers.

The Norwegian Register of Hunters registers those who are licensed to hunt game in Norway.

The Register of Mortgaged Moveable Properties registers entitlements and mortgages/security interests on moveable properties.

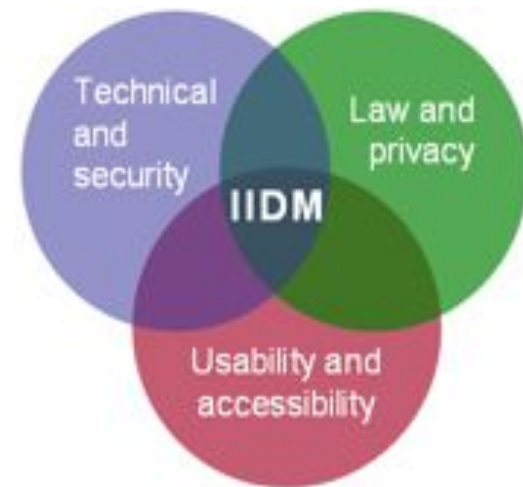
The Voluntary Register of Complementary Practitioners registers practitioners who are members of an approved practitioner organization. The registration scheme is voluntary.

The Register of Non-Profit Organizations registers associations, foundations and limited liability companies that are engaged in non-profit activities.

...

2 (13) Hypotheses

- (H1) For different security and privacy levels, it will be possible to select a **small, but sufficient number of complementary authentication mechanisms** that will cover the needs of most users (ideally all).
- (H2) The use of **multimodal user interface** element can remarkably increase the accessibility and usability of ICT-based authentication and IIDM-solutions.
- (H3) It is possible to **personalise** and adapt the user interface of IIDM-systems to each user's preferences and needs without compromising legal frameworks or the users' privacy.



3 (13) Smart cards

Recent researcher experiment:



(Dr. Lothar Fritsch)

4 (13) “Idea” scenarios

A group of 4 friends (person A, B, C and D) are having dinner at a restaurant. They agree to split the bill of 1000 NOK evenly between them. B, C and D do not have enough cash with them so A agrees to settle the bill and B, C and D will pay their part of the bill by using the new online payment sharing application (“PayShare”) provided at a particular social media.

Preconditions:

- Each person sharing the costs must be part of the same social media, for example all have an account with Facebook.
- Social media supports or provides for payment sharing application or PayShare.
- Social media and PayShare are connected with a financial institution or other institution providing online payment services.

(Dr. Maryke Nuth)

5 (13) Recruitment of real users

Three user organisations participate in e-Me:

1. **Seniornett Norge** promotes the participation of the elderly in the e-Society. It organizes local senior clubs that are motivating and teaching elderly to use ICT.
2. **Norwegian Dyslexia Association (NDA)** is a national organisation for persons with functional disabilities related to reading and writing. NDA promotes the interests of the dyslectics in education, work, media and research.
3. **The Norwegian Association of the Blind and Partially Sighted (NABP)** works to achieve equal opportunities and status in society for people with visual impairment, and provides a multitude of special products and services.

(Dr. Ivar Solheim & Kristin Skeide Fuglerud)

5 (13) Elderly people



5 (13) Elderly people



**... who use ICTs daily
for different purposes**

© clipart.com

Proportion of respondents reporting different levels of difficulty on 16 World Health Survey* domains of functioning**:

	None	Mild	Moderate	Severe	Extreme
Cognition					
Concentrating, remembering	61,5	20,0	11,8	5,5	1,3
Learning	65,5	17,3	9,8	4,7	2,5
Vision					
Near vision	76,3	11,9	7,0	3,8	1,0

* World report on disability 2011. World Health Organization (p. 289).
http://whqlibdoc.who.int/publications/2011/9789240685215_eng.pdf

** Data on 16 items. Table (partial) shows the proportion of respondents who responded in each category.

5 (13) Local statistics



Estimated proportion of Norwegian population of 4,92 million people:

Impairment	
Vision	Partially sighted or blind: ca. 130 000. Colour blind: ca. 5 % of the population
Hearing	Hearing impairment: ca. 600 000.
Motion	Muscle and skeleton: ca. 24 % experience problems.
Cognition	The largest and least homogeneous group. Ca. 30 % of the population has reading and/or writing disability which affects the person's working or learning ability. Ca. 500 000 suffer from dyslexia.
Over 80 years	230 000, ca. 5 % of the population.

6 (13) Alternative login-mechanisms

- Password



Logg inn

Brukernavn: riitta

Passord:

Neste

- Picture “password”



Nedenfor vises 12 bilder.
Du skal velge 4 av dem ved å klikke på dem.

Finn et av bildene du valgte blant bildene nedenfor.

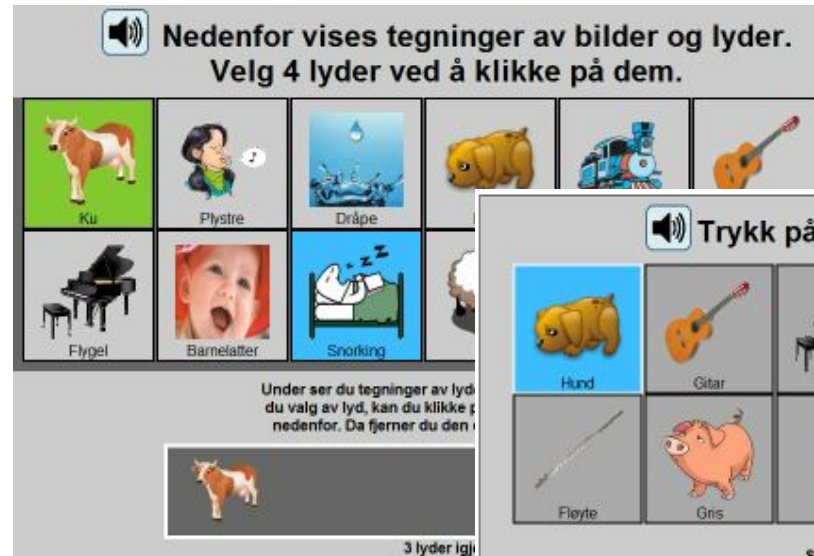
Steg 2 av 4

Neste

(Knut Eilif Husa & Sverre Morka)

6 (13) Alternative login-mechanisms

- Sound “password”



- Personal questions

? Lag 3 personlige spørsmål.

Spørsmål: Velg spørsmål.

Legg til:

Hint:

Spørsmål	Svar	Hint	Endre/Slett
Hva het ditt første kjæledyr?	Samjuk	"Sami"	

Forrige

Neste

6 (13) Alternative login-mechanisms

■ Pattern



Yes, yes...

$$\frac{\partial p_r}{\partial t} + \frac{1}{r^2} \frac{\partial}{\partial r} (r^2 p_r w_r) = \Psi_r p_r, \quad (p_r = n_r p_{r0}), \quad (55)$$

$$p_r \frac{dw_r}{dt} = - \frac{\partial}{\partial r} (p_r + p_r) + f_r \left(\frac{dw_r}{dt} = \frac{\partial}{\partial r} + w_r \frac{\partial}{\partial r} \right), \quad (56)$$

$$\begin{aligned} \frac{\partial}{\partial t} \left[p_r \left(w_r + \frac{w_r^2}{2} \right) + e_r \right] + \frac{1}{r^2} \frac{\partial}{\partial r} \left\{ r^2 \left[p_r w_r \left(w_r + \frac{w_r^2}{2} \right) + e_r \right. \right. \\ \left. \left. + w_r (p_r + p_r) + q_r + S_r \right] \right\} \\ = q_{ir} + f_{ir} w_r + \Psi_r (E_{ir0}) + \frac{1}{2} m_r w_r^2, \end{aligned} \quad (57)$$

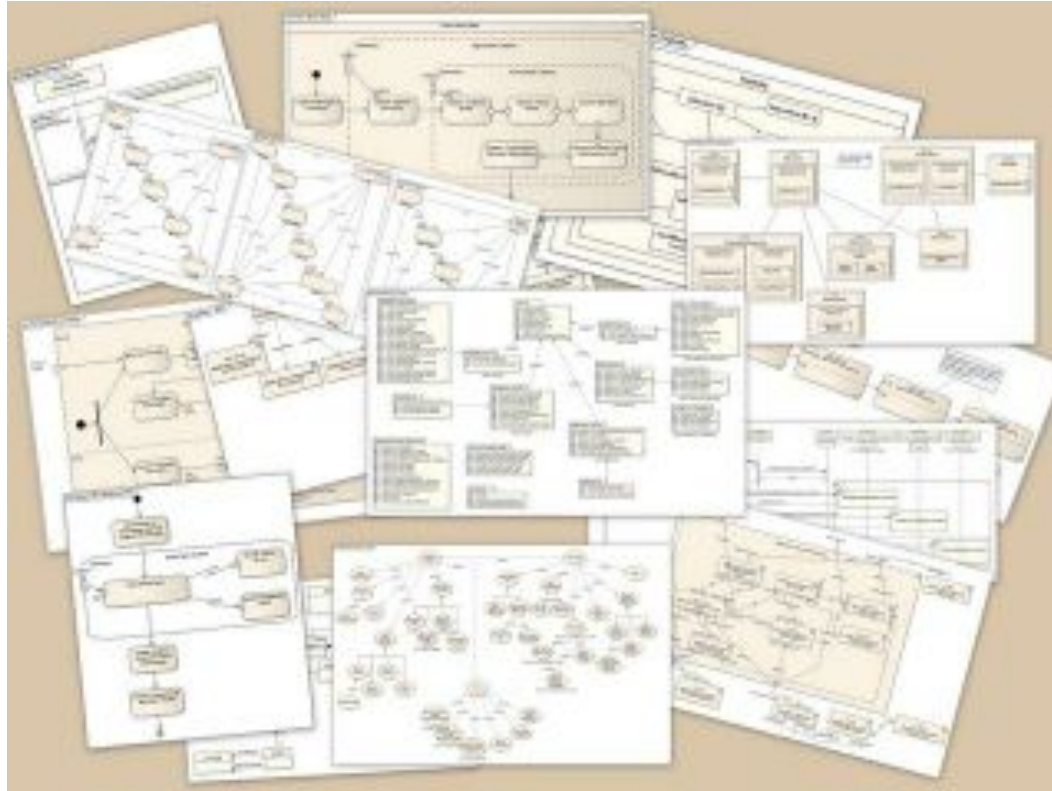
- Parameters for complexity / security level.
- Privacy considerations (hearing sound, observing pattern).
- Possible test setups for “acceptability”, usability, accessibility, memory, etc.
- **Experimental personalisation** e.g. by use of OpenID attributes.
OpenID allows you to use an existing account to sign in to multiple websites, without needing to create new passwords; <http://openid.net/>.

7 (13) “Legal” scenarios

<u>I. IDENTIFICATION OF PROCESSES</u>	
Some processes involved in the scenario:	
I.I Log In Process (“LI Process”)	
a. Registration of attributes or characteristics of a person or another	
b. User authentication process	
c. Access authorization process (to be authorized or not based on user attributes)	
d. Grant of access	
I.II Transactional Process	
A. Initiating the transaction	
- By way of clicking on an icon in the PayShare application [Linkability of information stored in the application and authentication]	
<u>II. IDENTIFICATION OF ROLES</u>	
1. Roles recognized under EU Data Protection Directive	
(i) <i>Registered person / Registered person</i>	
➤ Identified or identifiable	
➤ For example: User of the application	
(ii) <i>Responsible person / Responsible person</i>	
<u>III. SOME RULES RELATING TO DATA COLLECTION AND PROCESSING</u>	
EU Data Protection Directive	
- Art. 6 Personal data must be	
1. processed fairly and lawfully	
2. collected for specified, explicit and legitimate purposes and	
processed personal	
➤ For example: outsourced controller.	
(iv) Third party	
➤ A natural or legal person	

(Dr. Maryke Nuth)

8 (13) From scenarios to UML-diagrams

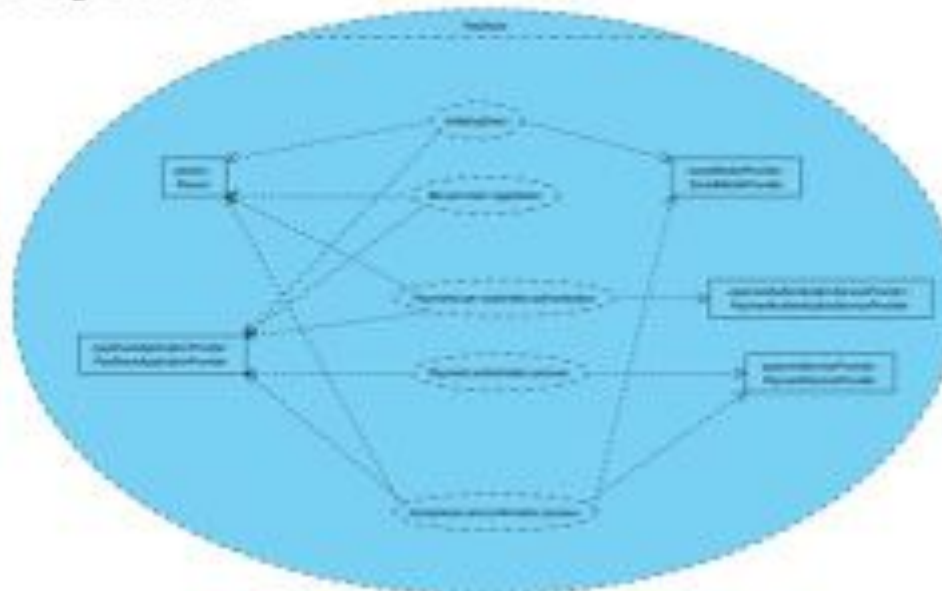
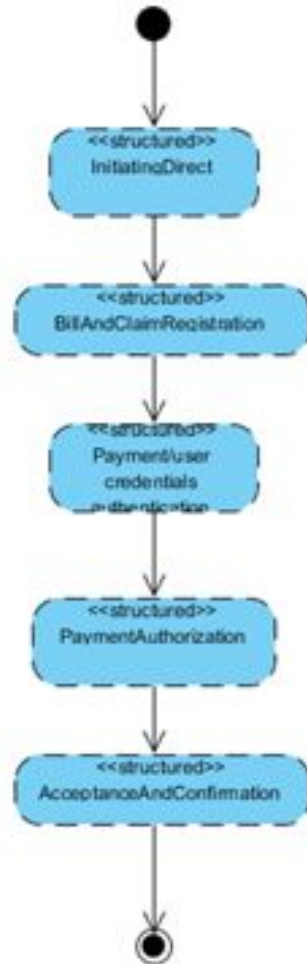


Unified Modelling Language (UML) is a standardised general-purpose modelling language. It includes a set of graphic notation techniques to create visual models of object-oriented systems.

Diagrams include e.g.:

- activities
- actors
- business processes
- database schemas
- (logical) components

(Wikipedia)



(Knut Eilif Husa)

9 (13) PIA

- A PIA is a process which helps identify and **assess privacy risks** to individuals in the collection, use and disclosure of information.
- Numbers of templates exist for:
 - Initial assessment
 - Full-scale PIA
 - Small-scale PIA
 - Privacy law compliance check
 - Data protection compliance check

http://www.ico.gov.uk/upload/documents/library/data_protection/practical_application/privacy_impact_assessment_overview.pdf

(Dr. Lothar Fritsch)

10 (13) Development

“Elgg is an open source social networking engine, delivering the building blocks that enable businesses, schools, universities and associations to create their own fully-featured social networks and applications.”

<http://elgg.org/>

Scenarios, login mechanisms, ...

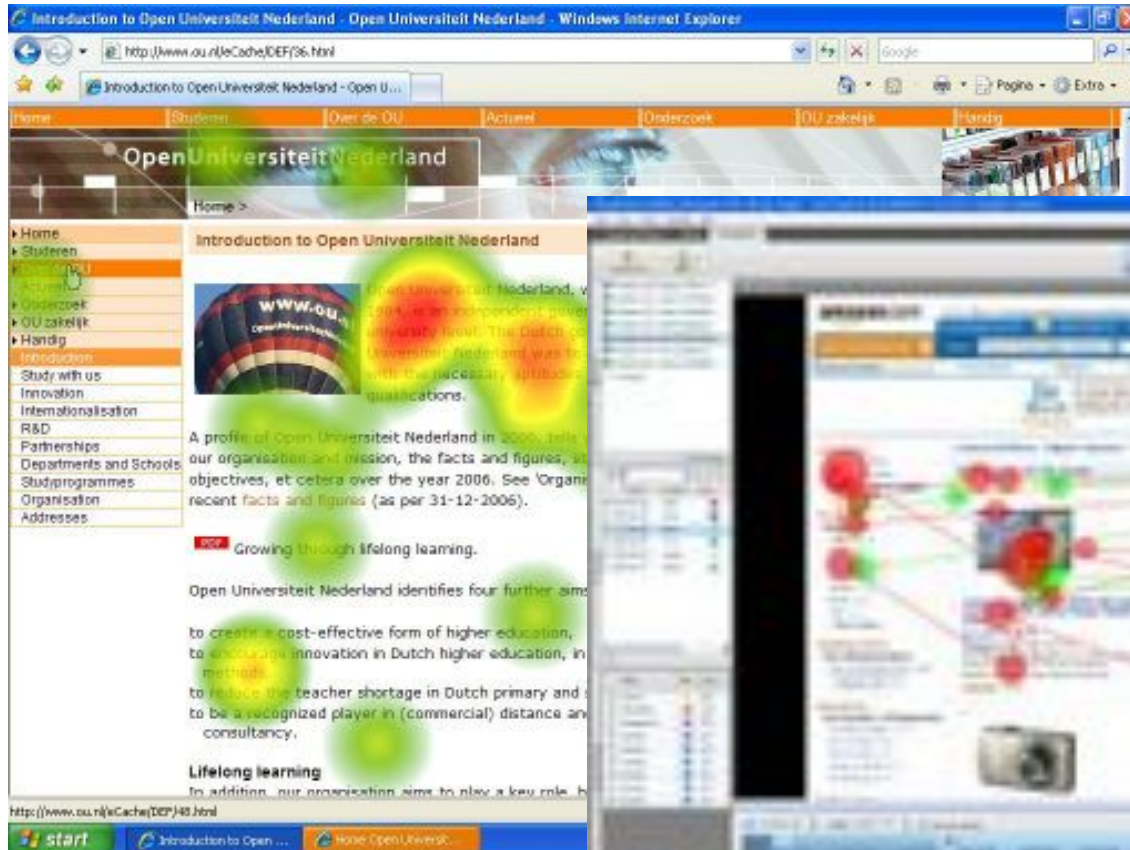


**Accessible
PayShare-process
in social media**

(Till Halbach Røssvoll)

11 (13) Tests and trials

■ Eye-tracking by Tobii-equipment



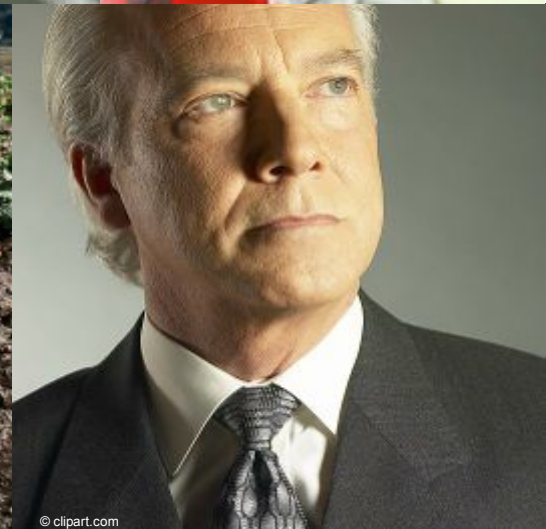
(Dr. Ivar Solheim, Kristin Skeide Fuglerud & Gro Marit Rødevand)

12 (13) Real use

- Really real... but just for research purposes.
(A group of 4 friends (person A, B, C and D) are having dinner at a restaurant...)



So, who are the users in focus?



Cost and benefit considerations

- What is the effect on the business if not everyone can use the system or service?
- What is the alternative for people who cannot use the system or service?
- What impact will negative publicity have? How about risking a lawsuit (cf. public procurement and anti-discrimination laws)?
- What would it take to make the system or solution accessible?
- How much will it cost to establish or maintain an alternative solution?

Norsk Regnesentral (NR) – project owner

Karde AS – project coordinator

Tellu AS

Institute of informatics, University of Oslo

Norwegian Research Centre for Computers and Law, University of Oslo

Storebrand Group

Encap AS

The Brønnøysund Register Centre

Seniornett Norway

Norwegian Dyslexia Association

Norwegian Association of the Blind and Partially Sighted

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