A talk about Universal Design at macro, meso, and micro level
Goals of the day

• Learn about four (4) concepts/areas + do some exercises:
  1. Universal Design: history and terminology
  2. Laws (old and the new WAD)
  3. Brief on Ch. 16 – Working with users with impairments (*the old edition of the book is Ch. 15)
  4. Theory: Medical vs. Social model, GAP model, Accessibility pyramid, Socio-materiality

• Have an understanding of the relation between the terminology used
• Look at some real-life examples from research projects and industry
A story

Lisa is a young girl, she is all grown up, 25 years now.

She moved to Norway for her master, after studying and working for some years in Finland, where she learned the language. She also can understand some Norwegian.

She is originally from (e.g. PICK AN ASIAN COUNTRY 😊).

Now, once she moved to Norway, she has to switch between four languages daily: English, Norwegian, Finnish, and her mother tongue (?).

She uses the following digital interfaces, which are new for her: Vortex webpublishing system, Slack, Canvas, Studweb, Piazza, Inspera, Outlook email, University library system, Skattetaten, NAV, Google Drive. In addition she uses some social media from time to time: both those used in her home country, and here.

Many of the systems she uses were not necessarily designed with universal design in mind.

Lisa feels: tired more often, fatigue, she cannot focus on her studies because she needs to focus on learning the systems. She feels overwhelmed and has sleep problems.

• What kind of «disabilities» do you think Lisa encounter?
• In which situations?
“Everyone is a genius. But if you judge a fish by its ability to climb a tree, it will live its whole life believing that it is stupid.” (Albert Einstein)
Writing session – Did you encounter such a situation?

a) Find a situation when you did not manage to use a digital system. (1 minute)

b) Describe the situation, what happened (3 minutes)

c) Present story to the others (group 3-4 people, 5 minutes)

d) Discuss in class (5 minutes)
Learning:

Universal design is for all people, not only for people with disabilities. We all become disable in certain situations.
A bit of history and background

Universal design
Universal Design – a discipline?

• It is an ideological point of view

• A discipline?
  • Orthogonal to many fields and disciplines: integrated within architecture, product design, information design, service design, ICT
  • A strategy, an approach
Ronald Mace (1941 - 1998)

Original definition:

«Universal Design is the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design» (Ronald Mace)

Image source:
https://projects.ncsu.edu/design/cud/about_us/usronmace.htm
**Universal design**

- barrier-free design vs.
- universal design vs.
- assistive technology vs.
- inclusive design

**Barrier free design**
- ADA - the law vs. Barrier-free design - a portion of that law
- ADA is not Universal Design, it's a disability mandate

**Universal Design**
- focuses on the user, not necessarily on people with disabilities
- «we all become disable as we age and we lose ability» (Ron Mace)
- For the build environment and consumer product

**Assistive technologies (hjælpmiddel)**
- "personal use devices" (e.g. eyeglasses, wheelchair, for "some" individuals), not a "consumer product"
- helps one to be functional in the environment

**Inclusive design**
- ‘The design of mainstream products and/or services that are accessible to, and usable by, as many people as reasonably possible ... without the need for special adaptation or specialised design.’ (British Standards Institute, 2005)
- Contradicts universal design a bit and its mantra of “one size fits all” → not possible to design for an entire population: develop a family of products instead
- Each product is designed with a target population/user in mind (tablet for children, tech-people, and the old)
- Flexible use in a different situations, by different users (Click here to read more)
A bit confusing where to draw the line... Some examples from the physical world

• example where ADA applies, but not UD: an accessible room for wheelchairs, but only in a specific part of the building (say only allowing left-handed transfers to the toilet). It complies with ADA, but not with universal design.

• Some things play role: where the item is placed, shape of an item, size of an item, if an item is adjustable or adaptable
Architecture projects considering UD


The building followed the codes: elevators and wide doors opening automatically, as part of the design.

BUT, at a closer look, when a wheelchair user was going to make a presentation, there was no access to the podium, for the speaker. (Vavik, T., 2009)
Product design

Oxo

Panasonic dryer

Old packaging vs. New packaging: design of packaging
Principles of Universal Design (recap)

1. Equitable use (e.g. equal ability to go up on a bus for both people in wheelchair, and without wheelchair – use of ramp vs. no need for using the ramp)

2. Flexibility in use (table with adjustable height, chairs)

3. Simple and intuitive use (iPhone design – same button at the same place in different versions)

4. Perceptible information (consistency in using symbols for radio buttons, send button in apps, save icon etc.)

5. Tolerance for error (undo button, reliable feedback, oven lock button for children safety)

6. Low physical effort (ATM machine, payment terminals)

7. Size and space for approach and use (going through the gates of a metro-station or security control at airport – the gates should have be large enough so it accommodates different individuals)
Macro-meso-micro level: Classification based on G. A. Giannoumis (2016)

**macro** level: social and legal aspects, norms;

**meso** level: removing barriers for use and participation; studies of computer science and engineering that investigate the use of technology as a mechanism of participation; (applied informatics/computer science)

**micro** level: examines individuals and groups in Universal Design as an approach to understanding human characteristics; human factors and psychology; (specific in human-computer interaction)
Universal Design in Interaction Design

Based on The Encyclopedia of Human-Computer Interaction, Constantine Stephanidis
Design for All

• In Interaction Design, we call Universal Design, Design for All

• Term coined in 1999

• Origins in: User-centered design, assistive technologies, and Universal design

UCD
• Focus on multi-disciplinarity and getting a deep understanding of the user, but it does not necessarily focuses on all types of users.
• Example: usability studies

Assistive technologies
• Accessibility studies in Human-Computer Interaction (HCI), access to ICT

Universal Design
• Design for as many people as possible + See start of the lecture 😊
Design for All - methods and techniques

- observation
- surveys and questionnaires
- interviews
- activity diaries and cultural probes (see book chapters + Bill Gaver’s article on Cultural probes)
- group discussions --> focus groups and group interviews
- empathy and research approaches based on scenarios, storyboards and personas

- prototyping (lo- and hi-fi)
- speech-based
- haptics (Braille)
- scanning-based interaction
- eye-tracking
- gestures and head-tracking (wearables)
- brain interfaces
- sign language
- multimodal interfaces
Other tools
Funkify to empathize with the user – Try it out at home/during the ‘gruppetimme’☺

1. Search in Google Chrome on plugin Funkify-disability simulator
2. Add the extension to Google Chrome
3. Now go to www.sas.se and activate the Simulator on Blurry Bianca
4. Now change the simulator to Dyslexia Dani.
5. What about Tremling Trevor
6. Or Tunnel Tobi (tunnel vision)
7. Have your phone or an online timer next to you. Try now Elderly Ellen, and follow the instructions:
   - Choose a Christmas trip from Oslo to Stockholm
   - Choose the date: 23rd of December
   - How long did it take for you to try to book it?
   - How long does it take for you to book the trip if you stop Funkify extension?

See also NoCofee Vision Simulator
Design for All (DfA)

• guidelines and standards - facilitate interoperability with new and emerging technologies (see WCAG)
• ideal vs. reality (praxis)
How to Make Your Colleagues Think Accessibility

June 12, 2016 by Tim Wibroe√

Example from industry

When developing a website which affects the life of almost every person in Norway, accessibility should be a main priority. Novicegetures who are not able to use FINN are unable to find a home without assistance. Accessibility considerations are too often an afterthought, and this can have profound effects.

In the Spring of 2016, a small group of employees got together to find out how to make our colleagues care more about accessibility. After two years, the measures we think work best are workshops, user tests, and automatic validation.
Universell utforming på nett og mobil

Det jobbes for at alle NRK sine digitale tjenester skal fungere like godt uavhengig av brukerens funksjonsevne og digitalt utstyr. På samme måte som NRK skal lage innhold til hele befolkningen, skal dette innholdet fungere like godt for alle - på nett og mobil. Dette mener vi at er avgjørende for å oppnå vårt mål om å være en almenningkaster i verdensklasse.

Hva betyr dette i praksis?

Noen bruker lesesneller eller justerer på farger og forstørrelse på "dagens" man er på nett med for å få en god brukeropplevelse. Andre har behov for at datamaskinen/nettbrettet/mobilen deres har en stemme som leser opp det som står på skjermen eller at de kan bruke stemmen til å finne frem med. Vi jobber med at våre nettsteder skal fungere uavhengig av om det brukes et lastat eller mus og og at grafikk eller lyd ikke er den eneste måten vi formidler vårt innhold på.

I NRKs tjenester på nett og mobil kan man i dag ta frem undertekster, synstolkning og tegnspråk der dette er tilgjengelig.

Teknologien utvikler seg fort. Og vi får flere og flere muligheter for å tilpasse brukeropplevelsen til hver enkeltts behov. NRK jobber hele tiden for å utnytte dette til det beste for publikum.

Hvorfor jobber vi med universell utforming?

Det er flere grunner til at vi jobber med å lage våre digitale løsninger så brukervennlige, og teknisk tilgjengelige som mulig, for alle. I Norge må alle følge diskriminerings- og tilgjengelighetsloven(DTL) som har tekniske krav slik at ingen blir utestengt fra den digitale verden. I tillegg til at NRK jobber med å følge disse kravene så har organisasjonen et mål om å være en almenningkaster i verdensklasse. Dette er et ambisjonsstabl. For å nå dette målet må NRK sørge for at være folks førstevalg uavhengig av hva slags dings, fordigheter eller funksjonsevne brukeren har.

Hvordan jobber vi med universell utforming?


Source: https://www.nrk.no/tilgjengelighet/tilgjengelighet-pa-nett-og-mobil-1.13648082
It’s illegal to have an inaccessible website in Norway—and that’s good news for all of us

Laws can change attitudes, and changed attitudes can change how we act.

PS: Find even more details and resources here: https://confire.com/a11y

SAS Norge AS ilagt tvangsmulkt

SAS må forbedre nettsidene
Flyselskapet SAS Norge vil nå dagbøter om de ikke gjør noe med nettsidene sine.

Etter en kontroll i fjor høst fikk flyselskapet beskjed fra Direktoratet for forvaltning og IKT (Difi) om at de måtte utbedre nettsidene sine.


Fellene rammer alle brukere, men særlig brukere med nedsatt syn. Nå truer Difi med dagbøter på 150 000 kroner fra 30. august om ikke tilgjengeligheten til billettkjølingen hos SAS raskt blir bedre.

Det å kjøpe flybilletter på internett blir i dag regnet som en selvfølge. Derfor er dette en sentral del av retten til likeverdige digital samfunnsdeltagelse, slår Difi fast.

Kilde: Difi.no


Example from industry
Exercise

• Exercise:
  a) Write down 1-2 similarities and differences between build environment and digital environment (4 minutes)
  b) Discuss with your neighbour (3 minutes)
  c) Examples in plenum (3 minutes)
Laws and regulations

Previous laws + new law
Amongst the prioritized areas in Norway

- building and construction
- planning and outdoor areas
- transport
- ICT
- communication policy, focus on children and young people, research and investigation

GOAL

WHY?
- use of digital solution → chance to be excluded

Goals subject to deadlines (p. 8)
- All new ICT intended for the general public is to be universally designed as from 2011
- All existing ICT intended for the general public is to be universally designed by 2021
Laws and regulations: in Europe and Norway

• From WCAG 2.0 to WCAG 2.1: https://www.w3.org/TR/WCAG21/


• Harmonised EU standards – Accessibility requirements for ICT products and services (STANDARD EN 301 549, mandat 376) https://www.etsi.org/deliver/etsi_en/301500_301599/301549/02.01.02_60/en_301549v020102p.pdf


• Proba Samfunnsanalyse: https://www.bufdir.no/Global/Barrierer_i_hoyere_utdanning_for_personer_med_nedsatt_funksjonsevne.pdf

• Likestillings- og diskrimineringsloven https://lovdata.no/dokument/NL/lov/2017-06-16-51

• Forskrift om universell utforming av IKT-løsninger https://lovdata.no/dokument/SF/forskrift/2013-06-21-732
Web Accessibility Directive: Norway is facing a choice

How is Norway going to transpire the new EU regulations on web accessibility when the existing legislation has a broader scope? Funka has participated in the public hearing and written a formal response.

Norway is not part of the European Union, so the EU legislation is not directly applicable. The current Norwegian legislation covers most public websites and has a broader scope than the upcoming EU regulations. On the other hand, the Norwegian law is not covering all WCAG 2.1 AA success criteria.

Another difference is that the existing Norwegian legislation covers "the main solution" (usually a website or an app), whereas the directive covers activities, intranets, intranets and documents, and places the public sector bodies to publish an Accessibility Statement.

Dichotomous would be cumbersome

From the user, market and management perspectives, the last option is clearly preferred, and thus it becomes important also politically. It would be frustrating for users if public services are significantly less usable than commercial services. Users have at least as much a need to use a bank, go to theaters or buy things on the Internet as they need to use public services - life is more than just communicating with authorities, which is reflected in the current Norwegian legislation. Nevertheless, it will be very time-consuming for Norwegian IT suppliers to manage two different versions of systems and deliveries. In addition, the monitoring will be more complex with two parallel regulations, and since the legislation and/or standards referred to in the law will in all probability be further developed later on, a division will make this even more complex.

One example: to expand the legislation to the intranets is among other things an important step towards an accessible digital work environment. This is of course equally important in public and private sectors. As we saw in our survey “Digital barriers to employment”, the digital work environment causes discrimination of workers. Some work tasks were not possible for everyone to perform, and in extreme consequence to such a large extent that it was not possible for some of them to do their job. In other words, accessible digital working environment is an important tool for equality and anti-discrimination, and is also a prerequisite for an inclusive Norway. Funka is therefore strongly in favor of extending the scope of the legislation to both public and private sectors.

Another example in which the EU directive goes further is what WCAG criteria are included. The Norwegian Regulations for accessibility of ICT have some exceptions from WCAG 2.1 AA that the EU Directive covers. The purpose of the exceptions was not to hinder the use of video because of increased costs for providing captions. But the technological development has made it significantly less costly to meet the current WCAG criteria in videos, while the same time it has become even more important for video producers to create content based on how video is being used by users (often with the sound switched off in public surroundings) and how video is presented in social media. This means there is no longer any reason why people with impaired hearing should be excluded from the regulations.

Harmonisation

An important objective of the EU directive is harmonisation. It would be unfortunate if Norway stood outside the opportunities that the internal market entails. An essential purpose of the directive is to create equal competitive conditions across national borders. Without such harmonisation, Norwegian businesses wishing to compete in the European market would have to deal with different rules than at home, which becomes ineffective, with an expense that could easily end up with the customer. Similarly, procurers and purchasers in Norway would be able to evaluate offers from foreign actors on the same terms with the Norwegian if the foreigner were to initially relate to another regulatory framework.

Norway can afford to ensure that persons with disabilities get the best chance of a life on equal terms with others. Norway has ratified the UN Convention on the Rights of Persons with Disabilities and the overall strategy around communication and e-services is living by the ambition of providing "a digital first choice". To make that a real choice for everyone, the interfaces and course need to be accessible.

Source:
https://www.funka.com/en/design-for-all/accessibility/web-accessibilitydirective-norway-is-facing-a-choice/
WAD in Norway: «Krav om tilgjengelighetserklæring og tilbakemeldingsfunksjon»

a) «En forklaring av innhold som ikke er tilgjengelig, og med en begrunnelse for hvorfor innholdet ikke er tilgjengelig. Dersom det er egnet skal det stå hvilke tilgjengelige alternativer som er innført.» [Information/Erklæring]

a) «En beskrivelse av, og en lenke til en tilbakemeldingsfunksjon hvor brukeren kan gjøre det offentlige organet oppmerksom på at nettsiden eller mobilapplikasjonen ikke oppfyller tilgjengelighetskravene i artikkel 4. Videre kan brukeren anmode om opplysninger som er unntatt etter artikkel 1(4) og artikkel 5 (forholdsmessighetsvurdering).» [Feedback/input from the user - function]

a) «En lenke til håndhevingsprosedyren, som følger av artikkel 9, som kan benyttes i tilfelle brukeren får et utilfredsstillende svar på tilbakemeldingen eller forespørselen.» [Link to an enforcement procedure/text]

Source:
https://www.regjeringen.no/contentassets/7c8c07956de7491b8d028f3f53283aed/hoeringsnotat_eus_direktiv_om_tilgjengelighet_av_nettsider.pdf
Laws and regulations: in Europe and Norway

- From WCAG 2.0 to WCAG 2.1: https://www.w3.org/TR/WCAG21/
- Harmonised EU standards – Accessibility requirements for ICT products and services (STANDARD EN 301 549, mandat 376) https://www.etsi.org/deliver/etsi_en/301500_301599/301549/02.01.02_60/en_301549v020102p.pdf
- Proba Samfunnsanalyse: https://www.bufdir.no/Global/Barrierer_i_hoyere_utdanning_for_personer_med_nedsatt_funksjonsevne.pdf
- Likestillings- og diskrimineringsloven https://lovdata.no/dokument/NL/lov/2017-06-16-51
- Forskrift om universell utforming av IKT-løsninger https://lovdata.no/dokument/SF/forskrift/2013-06-21-732
Laws and regulation: Universal Design in Higher Education, in Norway

Forskrift om universell utforming av informasjons- og kommunikasjonsteknologiske (IKT)-løsninger

§ 2. Virkemål

Forskriften gjelder for IKT-løsninger som underbygger virksomhetens alminnelige funksjoner, og som er hovedløsninger rettet mot eller stilt til rådighet for allmennheten. Forskriften gjelder også for IKT-løsninger i utdannings- og oppbygningssektoren.

Forskriften er begrenset til å gjelde nettløsninger, herunder digitale læremidler, og automatere.

Forskriften gjelder på alle samfunnsområder.

Forskriften gjelder ikke der utformingen av IKT-løsninger reguleres av annen lovgivning.

Forskriften gjelder ikke på Svalbard og Jan Mayen, på installasjoner og fartøy i virksomhet på norsk kontinentalsokkel eller på norske sokkelområder innenfor hvor de befinner seg.

§ 11. Ikraftsettelse og overgangsregler


(Resource: https://lovdata.no/dokument/SF/forskrift/2013-06-21-732)
Laws and regulations: Universal Design in Higher Education, in Norway

Universell* - jobber for samarbeid og kunnskap om læringsmiljø, universell utforming og inkluderende løsninger i høyere utdanning.

Why Universal Design in Higher Education?

Diversity

- communication skills
- culture, marital status
- ability to attend
- learning abilities
- sexual orientation
- Intelligence
- ethnicity
- interests
- sensory abilities
- physical abilities
- values
- social skills
- learning styles
- family support
- age
- socioeconomic status
- religious beliefs
- race
- gender
Examples of Universal Design in Higher Education

**In instruction:** class climate, interaction, physical environments & products, delivery methods, information resources and technologies, feedback and assessment, accommodation

**In services:** planning, policies and evaluation; physical environments and products, staff, information resources and technology, events

**In information technology:** procurement, development policies, procedures; products; staff; input, output, navigation and manipulation; compatibility with assistive technology

**In physical spaces:** planning, policies and evaluation; appearance; entrances and routes of travels; furniture; safety; accommodation
Students’ voice

On Universal Design
Radio theater about Universal Design
Listen at home or during ‘gruppetimme’ 😊

https://soundcloud.com/vetle-utvik/vetleradioteater1/s-bD64Z
9 guidelines that should help designers and developers to develop a UD web-application

Foundation

1. Communication
2. Become familiar with the requirements
3. Universal design does not take a lot of time
4. It is not boring

Design- and developing process

5. The users have different abilities
6. Make visible the positioning
7. Different web-browsers and operating systems
8. Accessibility tools
9. Playful interaction
«What’s in the book» (in brief)

(* Based on *Ch. 15 in the old edition of the book*. In the new version of the book, you can find the same topics in Ch. 16 – Working with research participants with disabilities)
Some things from the book...

- Variations in people with impairments: perceptual-, motor-, and cognitive impairments;

- Challenging to have access to people with impairments: small sample size (5-10), distributed research, in-depth case studies;

- **Proxy-users**: individuals without impairments representing individuals with impairments (e.g. blindfolding people, or close people to individuals with impairments, such as family members, care takers etc.);
Developing interfaces for people with impairments - two approaches

**Universal design approach**
- make an interface that works well for a majority of users with impairments
- the users get the same task goal as users with no impairments.
- The users with impairments will utilize alternative input or output devices.
- The interface will be easier to use by both people without and with impairments --> "universally usable" when evaluated by 3 of 4 users.
- When involving both users with- and without impairments, we call the studies *multipopulation studies.*

**Assistive technologies approach**
- design an interface that is optimized for a specific user group.
- This approach tends to be used for people with severe cognitive impairments.
- The task scenarios and applications are very focused on the specific needs of the user population.
Recruiting users through community partners

• partner with a community-based group that focuses on the impairment of interest to the research
• these organizations often include caregivers and family members
• check out national and local organizations of interests - and attend their gatherings
• think "win-win": they help you, you help them - through volunteer work or some other contribution
• try to understand the users' preferred method of communication and any related challenges
Pilot-studies

• since you may have **access to a limited number of users**, you won't have the opportunity to "lose your chance" on collecting the data properly --> **pilot studies are needed** - see it as an opportunity that allows you to eventually "fail" :), where you can uncover eventual problems

• enough with 1-2 users during the pilot-study

• Perhaps use **proxy-users here**
Scheduling users with impairments

• users with impairments may rely on others, when it comes to public transportation, set-up of assistive tools etc. - This requires careful planning.

• it is often better that the researchers visit on-site the users, instead of asking them for coming to a specific location. This is also often an opportunity for the researcher to understand users' environment better.

• As for the users, it is more relaxing/comfortable for them to be in their own natural environment, having all the assistive technologies they need at hand.

• the drawback is that researchers have less control over the users' environment.

• note that you might need to schedule research sessions during evening or weekends.

• depending on the user's severity of the impairment, the session may take shorter or longer time.
Different levels of ability

• the severity of the impairment will vary

• it is important to understand the nature of the population, by consulting with experts in that specific impairment

• other factors that influence the performance on interface-related tasks: confidence, self-efficacy, previous experience. The results are not always what they seem.

Documentation for users with impairments

There are needed a number of documents when working with human subjects, including:

• forms (informed consent - see IRB in the book)
• instructions
• task lists
• questionnaires

These documents might become problematic if, for instance, the
• users are print-disabled (blind, with low vision, or having dyslexia).
• If children are involved, the researchers themselves might need to submit their own approval related to criminal record background check.
• Alternatives to give consent?
Working with users with impairments

Bringing extra computer parts
• Depending on what type of users will you be working with, and what extra devices they need in order to be able to perform the task scenarios

Payment
• the form of payment should be useful to the users, e.g. gift cards for a specific store may not be useful if the people cannot use it (giving a gift card to a paper book store to blind users)
Theory: models and concepts

Medical vs. Social model, Socio-materiality
Recap

• Background of Universal Design
  • Term
  • Barrier free design vs. Assistive technologies vs. Universal design

• Universal design in Interaction Design = Design for All
  • Formula: UD in ID = DfA 😊

• Laws and regulations (in Europe and Norway)

• Ch 16 (15 in the previous book version) – Working with users with impairments (focus on disabilities)
Socio-medical model: disability vs. ability

• Universal Design (UD) has often been associated with disability (Lid, M. 2013; Grue, J., 2011);

• Discourses on disability were mainly from a medical and social model perspective (Lid, M., 2013 in Saplacan et al., 2018);

  “UD is a carrier of democratic values where one should shift the focus from “accessibility for people with disabilities” to considering that there is out there <<one population comprising people with various abilities and impairments>>” (G. A. Giannoumis, 2016, p. 205 in Saplacan, et al., 2018)
Accessibly pyramid – understanding user diversity (an inclusive approach)

The pyramid model presents a continuum of population diversity. The prevalence data and definitions of difficulty levels are drawn from the Microsoft (2003) survey.

Source:
http://www.inclusivedesigntoolkit.com/whatis/whatis.html#nogo
The GAP model: «Disability is related to context»

- Image sources and more info: [https://uu.difi.no/kva-er-universell-utforming/kvifor-universell-utforming-av-ikt](https://uu.difi.no/kva-er-universell-utforming/kvifor-universell-utforming-av-ikt)

- Explanation of the GAP model (in English) at: [https://www.youtube.com/watch?v=KJ0CywDdYE8&t=18s](https://www.youtube.com/watch?v=KJ0CywDdYE8&t=18s)

- Read more: [https://studenttoolkit.eu/universal-design-for-learning/](https://studenttoolkit.eu/universal-design-for-learning/)
Socio-medical model: disability vs. ability

• Begnum (2016):
  • Medical model: focus on what is wrong with an individual
  • Social model: focus on what is wrong with the society, the individuals belongs to

"it is a social responsibility to ensure that different physical and psychological abilities are taken into consideration and barriers are removed and diminished“ (p. 2).
Other models?

  “has also measured the views of Norwegian experts on universal design of ICT. In her study she uses a range of models other than the medical and the social model, which can be regarded as the "outer extremes"”.

  • “the experts had several views simultaneously, but was surprised to discover that 77% agreed with the charity model.”
77% of the Norwegian experts that were included in Begnum (2017) study, agreed with this model.

Exercise: Which model would you choose?

Motivate your choice.

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expert model</td>
<td>Disability is seen as something that needs to be analysed by an external expert (other than the person having the disability). Suggestions are made on measures or assistance that are needed.</td>
</tr>
<tr>
<td>Empowering model</td>
<td>Disability is best understood by the disabled individual and treatment or assistance is decided by them. The expert becomes merely an advisor and service provider.</td>
</tr>
<tr>
<td>Charity model</td>
<td>&quot;Disability is something that has undeservingly afflicted someone, and disabled persons deserve sympathy, support and help.&quot; (Begnum 2016, p. 10)</td>
</tr>
<tr>
<td>Economical model</td>
<td>In what way impairments influence the ability to work and to be productive.</td>
</tr>
</tbody>
</table>
Socio-materiality of IT Systems

- Socio-materiality: social entity (humans with their social, cultural background) + material entity (IT Systems)
  - Can only be separated analytically (Orlikowski 2007; 2010; Orlikowski and Scott 2008; Introna 2013; in Stampe & Müller, 2018)
  - Two dynamic entities in complex settings: engineering, healthcare, public administration (Torkilsheyggi & Hertzum, 2017), robots used in home care, Learning Management Systems and other systems used in Higher Education
- Implications: social-material entanglements between technology, people and relations (Bratteteig & Verne, 2012a)
- Real examples:
  1. Lisa, as an immigrant user applies to a course in Higher Education. She gets the feedback message as a text “You are not qualified.”, and nothing else. She understand this as she is not qualified at all, although she thinks she fulfills all the requirements. Coming from another culture and society she does not dig deeper to see if it was any technical problem. She trusts the system. However, a Norwegian friend of her, calls the administration to see what happened with Lisa’s application. They discover that Lisa’s documents were OK, but in one of her working contracts was not specifically written that she has worked 100%. Therefore her application was declined. Until the application is re-processed, all the student spots available are filled. Lisa loses her opportunity to start her studies this year and needs to wait another year because of this.
  2. Lisa is now an old lady. She uses a robot vacuum cleaner in her home. She gets the feedback from the robot: “You cannot connect to the cloud.”. Although Lisa is quite smart, she is not used with tech-terminology. She does not understand the meaning of the “cloud” in this context.
How to «solve» the socio-material entanglements: Design in use

Distinguish between: design before use vs. design in use. What kind of design do YOU focus on?

Complex settings require systems that are incomplete by design, that are configurable, expandable and that encourages direct engagement of the user (Torkilsheyggi & Hertzum, 2017)

In many contexts, information systems are created by great people/employees, but the systems do not fit in larger contexts (Lundeberg, 2017).

Need for understanding larger context (Lundeberg, 2017)

Universal design/DfA supports this approach
How to «solve» the socio-material entanglements: Autonomy of the user - at use time

autonomy of the user from a socio-material perspective points out the diversity of users (Bratteteig & Verne, 2012a).

broad spectrum of users with different social and cultural background, we cannot assume that all users are interacting with the technology in the same way (Bratteteig & Verne, 2012a).

This is supported by Universal Design/DfA
How to «solve» the socio-material entanglements: How to give autonomy to the user then?

• Through *(virtual)* spaces for action and change for the user (Bratteteig & Verne, 2012b) – the user is given *agency* to act
  • Configuration
  • Adaptability

• *intra-actions*, by creating a space for change (Bratteteig & Verne, 2012b). They mean that a user, or a citizen for that matter, needs to have *autonomy* in his/her interaction with the digital interface (Bratteteig & Verne, 2012b).
  • The user shall be able to give feedback to the system (see also laws and regulations on UD discussed earlier)

• *Exercise*: What does empowerment of a user means when using a digital interface?
Future scenarios: Universal Design and AI

- Library applications for educational purposes (Project W) – for instance tailored information for individual students (Gasparini, A. 2018)
- AI - relevant within 4-5 years (Becker, A. et. al, 2017)
- Research done in “cooperation” with AI (Gasparini, A. 2018; Gasparini, A. et. al, 2018)
- How are UD and AI linked?
  - Face recognition
  - Use of e.g. IBM Watson to help students with disabilities (e.g. dyslexia, concentration problems) to read a text. The student can ask question about the text that has just been read up. The student gets answer.
  - User needs to give access to his/her privacy. How will this be done for users with disabilities? (Ethical dilemmas)
  - UD could help to map out AI and privacy issues
  - AI could help to avoid stigmatization
Master theses

- Pederen, Bjørnar, 2010, Trafikkinformasjon for synshemmede : Et casestudie av Trafikantens mobile tjenester
- Pettersen, Øyvind, 2011, Inclusive identity management : A case study investigating the accessibility of user registration
- Bording, Joakim, 2012, Follow the Sound : Design of mobile spatial audio applications for pedestrian navigation
- Bertelsen, Ola Njå, 2012, Universell utforming : Inkluderende og tilgjengelige autentiseringsløsninger
- Drevsjø, Lena, 2016, Seniorer og IKT; En kvalitativ studie om barrierer og motivasjoner
- Karoline, Sanderengen, 2017, En studie om arbeid med universell utforming ved design og utvikling av IKT-løsninger blant norske konsulentfirmaer
- Sletten, Kjetil, 2016, Using Bluetooth beacons in a museum: An exploratory study with proximity-based technology

( Check out also theses of Morten Tollefsen, Miriam Begnum)

PhD Theses

- Berget, Gerd, 2016, Search and find? An accessibility study of dyslexia and information retrieval
- Kristin Fuglerud, 2014, Inclusive design of ICT: The challenge of diversity (humanistisk fakultet)
- Harald Holone, 2011, Transient Cooperation in Mobile Information Systems : Accessibility mapping by sharing traces of activity

(Check out also theses of Morten Tollefsen, Miriam Begnum)
References

- + See also the links available on the slides. ☺
“Be the change you want to see in the world.” (M. Ghandi)