Digitalisation and its effects on society – particularly on higher education

Jan Gulliksen
KTH Royal Institute of Technology
Stockholm, Sweden

- Vice president for Digitalization
- Professor in Human Computer Interaction
- Member of the Swedish Digitalization Council
- Digital champion of Sweden
Traditional office environments
20 years of development

– Do you see the development?
Two types of digitalization

**Information digitalization** (English: digitization) a process in which information is transformed from analogue to digital, making the information structurable, searchable and accessible through the digital channels.

**Social digitization** (English: digitalization) is the change of society, working life, business, technology use and the new business conditions that arise from the opportunities offered by the technology.

Digital technology allows us to do things in completely different ways than we could before, but it also gives us the opportunity to do brand new things.

"The social and human-revolving process that gradually becomes increasingly difficult to distinguish at all from any part of life. This means that individuals and organizations can communicate and exchange information with other people, organizations and their environment in new ways. Digitalization and the use of ICT-based solutions can help to increase the accessibility and efficiency of both the business and public administration."

(SOU 2014:13, SOU 2015:91)
150 years of digitalization of the music industry
Digitalization – digital transformation
Digitalization of education
20 years of development

– Do you see the development?
The future pedagogy

The Flipped Classroom

**Before**
Students prepare to participate in class activities

**During**
Students practice applying key concepts with feedback

**In Class**
Students check their understanding and extend their learning

**After**

OUT OF CLASS
Blooms taxonomy and Flipped Classroom

- Remembering
- Understanding
- Applying
- Analyzing
- Evaluating
- Creating

Traditional classrooms

Flipped classrooms
MOOCs  Course  Massive  Online  Open
The Swedish digitalization strategy

**Vision:** A sustainable digital Sweden.

**General goal:** Sweden shall be the best country in the world when it comes to using the opportunities for digitalization

**Sub goals:**
- digital competence,
- digital security,
- digital innovation,
- digital leadership and
- digital infrastructure.

**The Governments overarching goals:**
Sweden shall have Europe’s lowest unemployment 2020

http://www.regeringen.se/49adea/contentassets/5429e024be6847fc907b786ab954228f/digitaliseringsstrategin_slutlig_170518-2.pdf
What will the future labour market look like?

Digitalization
Automatization
Robotization
Globalization
Urbanization
Individualization

Nearly half of US jobs could be at risk of computerization.

Creative and social intelligence skills are required.

“The future of employment: how susceptible are jobs to computerisation?”
by Carl Benedikt Frey and Michael A. Osborne, September 17, 2013
The job context of the "hour-glass economy"

For every 10 middle-skilled jobs that disappeared between 1996-2008 in:

<table>
<thead>
<tr>
<th>Country</th>
<th>Replacement Jobs</th>
</tr>
</thead>
<tbody>
<tr>
<td>UK</td>
<td>4.5 high-skilled and 5.5 low-skilled</td>
</tr>
<tr>
<td>Ireland</td>
<td>8 high-skilled and 2 low-skilled</td>
</tr>
<tr>
<td>France</td>
<td>7 high-skilled and 3 low-skilled</td>
</tr>
<tr>
<td>Germany</td>
<td>7 high-skilled and 3 low-skilled</td>
</tr>
<tr>
<td>Portugal</td>
<td>0 high-skilled and 10 low-skilled</td>
</tr>
</tbody>
</table>

1. **THE IOS DEVELOPER**
   - Apple announced the iPhone in 2007, and 3rd party development for iOS took off in 2008 with the release of iOS 2 and the App Store.
   - 2008: 89
   - 2013: 12,634
   - 142x growth in 5 years

2. **THE ANDROID DEVELOPER**
   - Google's Android platform was announced in 2007, with the release of the first Android-powered handset in 2008.
   - 2008: 53
   - 2013: 10,554
   - 199x growth in 5 years

3. **THE ZUMBA INSTRUCTOR**
   - Zumba started in the early 2000's and quickly gained traction in 2007 as fitness centers started popping up all over the US.
   - 2008: 16
   - 2013: 6,331
   - 396x growth in 5 years

4. **THE SOCIAL MEDIA INTERN**
   - LinkedIn, Facebook, YouTube and Twitter were all launched between 2003 and 2006. These networks really started taking off in 2010 and are currently at peak popularity. Not a coincidence this is a growing profession.
   - 2008: 25
   - 2013: 4,350
   - 174x growth in 5 years

5. **THE DATA SCIENTIST**
   - Our digital lives have created an overwhelming flood of information. In the last 5 years, data scientists have come to the rescue by trying to make sense of it all.
   - 2008: 142
   - 2013: 4,326
   - 30x growth in 5 years

6. **THE UI/UX DESIGNER**
   - User interface and user experience designers focus on making our technology pleasant and intuitive to use. Seeing as our lives depend on interacting with technology, it's no small wonder UI/UX designers are in high demand.
   - 2008: 159
   - 2013: 3,509
   - 22x growth in 5 years

Source: LinkedIn
7. **The Big Data Architect**
   - Although it's been around for at least 2 decades, the concept of big data took off around 2004. That year, the Computing Community Consortium published a white paper which propelled the term into the spotlight.
   - 2008: 0
   - 2013: 3,440
   - 3,440 x growth in 5 years

8. **The Beachbody Coach**
   - Beachbody coaches are distributors of fitness products produced by Beachbody LLC, the parent company of which is PMVX, launched in 2004.
   - 2008: 0
   - 2013: 3,360
   - 3,360 x growth in 5 years

9. **The Cloud Services Specialist**
   - Salesforce.com and Amazon were two companies that introduced cloud computing to businesses throughout the early 2000s. The stark contrast in the number of jobs shows how popular and reliable cloud services have become.
   - 2008: 195
   - 2013: 3,314
   - 17x growth in 5 years

10. **The Digital Marketing Specialist**
    - Social media and digital marketing have become significant facets of every business, and we're pretty glad that's the case!
    - 2008: 166
    - 2013: 2,886
    - 17x growth in 5 years

Source: LinkedIn
The ICT world is not enough
Companies can't find ICT specialists
Young people can't find jobs
Skills for the Digital Society

"I am very happy that digital skills are strongly recognised as basic skills, along with literacy and numeracy."

ANDRUS ANSIP

@Ansip_EU
#DigitalSkills
Multi-, Inter-, Transdisciplinary

**MULTIdisciplinary**
- Everyone working on the same problem within silo boundaries of own disciplines under their assumptions and restrictions
- Outcomes add to the body of knowledge
- Little innovation due to fixed philosophy & work in isolation from other disciplines

**INTERdisciplinary**
- Everyone working on the same problem with overlapping disciplinary boundaries blending of assumptions and restrictions
- Outcomes add to the body of knowledge & give theoretical solutions to problems
- Some innovation due to flexible philosophy & work influenced by other disciplines
- Cooperation yields disruptive innovation
- Collaboration yields cocreative innovation

**TRANSdisciplinary**
- Everyone working on the same problem by transcending disciplinary boundaries drawing on non-traditional perspectives crossfertilizing assumptions/restrictions resolving contradictory points of view
- Outcomes add to the body of knowledge & provide practical solutions to problems
- Lot of innovation due to open philosophy & work transformed by other disciplines
- Results in improved theories or models, newly invented methods or techniques, novel synergy of systems or structures, and innovative thinking or technologies
What is a Digital Work Environment?

"The work environment, with its problems and possibilities of physical, psycho-social as well as cognitive nature that is the result of the digitalization of the tools and support systems."
Thanks

Jan Gulliksen
gulliksen@kth.se
@jangulliksen
jangulliksen.com