

Kunnskap og kompetanse i det læringsintensive samfunnet - intelligens, bevissthet og roboter

Noen tanker etter nok et år med den 4 industrielle revolusjon



“

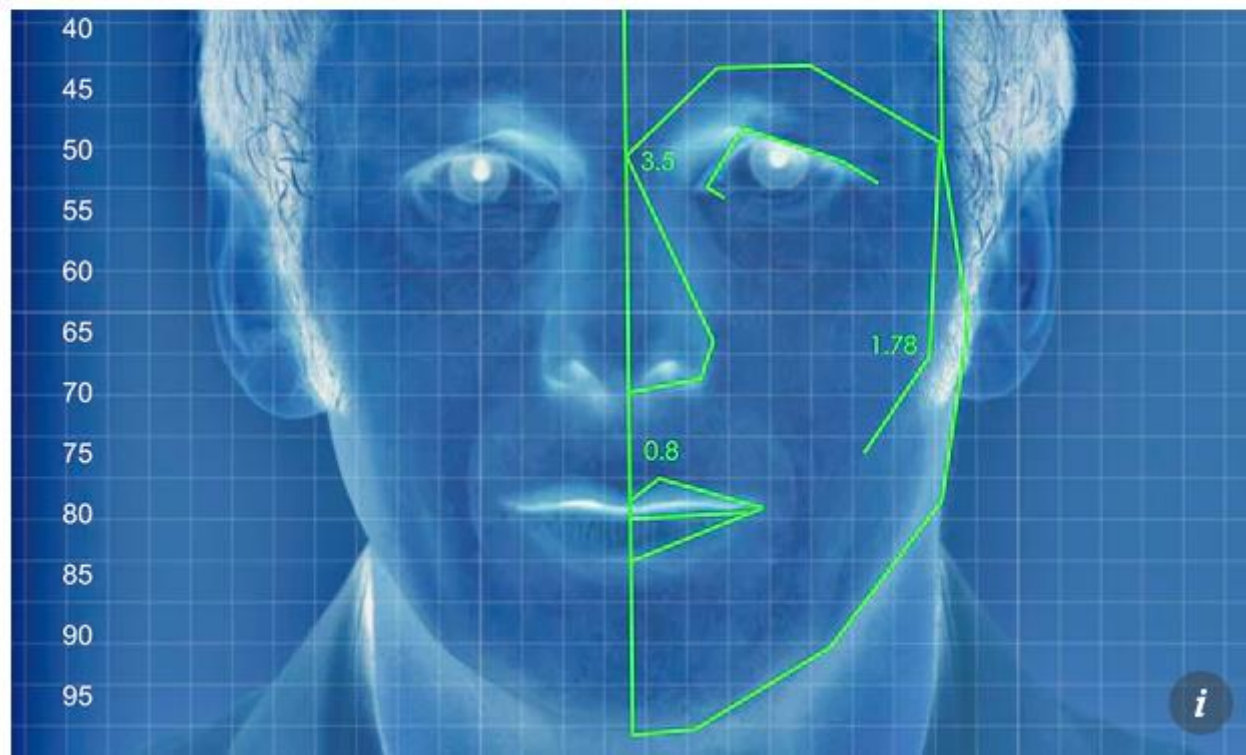
We seem to be sitting at the heart of a perfect storm where a lot of things are happening faster than our ability to predict and strategize”

- *Paul J. LeBlanc*

President of Southern New Hampshire University

New AI can guess whether you're gay or straight from a photograph

An algorithm deduced the sexuality of people on a dating site with up to 91% accuracy, raising tricky ethical questions



**Do we have to know
who's gay and
who's straight?
Can't we just love
everybody and
judge them by the
car they drive?**





"Like a pane of glass framing and subtly distorting our vision, mental models determine what we see."
- *Peter Senge*



“

“The purpose of looking at the future is to disturb the present.”

Gaston Berger

- 80% of all doctor visits will have been replaced by automated exams.
- Over 90% of all restaurants will use some form of a 3D food printer in their meal preparations.
- We will see a growing number of highways designated as driverless-vehicle only.
- A Chinese company will become the first to enter the space tourism industry by establishing regular flights to their space hotel.
- **The world's largest Internet company will be in the education business, and it will be a company we have not heard of yet.**
- Over 20% of all new construction will be “printed” buildings. [Details here.](#)
- Over 2 billion jobs will have disappeared, freeing up talent for many new fledgling industries.
- **A new protest group will have emerged that holds anti-cloning rallies, demonstrating against the creation of “soul-less humans.”**
- We will see the first city to harvest 100% of its water supply from the atmosphere.
- **Over 50% of all traditional colleges will collapse, paving the way for an entire new education industry to emerge.**
- **We will see a surge of Micro Colleges spring to life, each requiring less than 6 months of training and apprenticeship to switch professions.**
- Scientists will have perfected an active cross-species communication system, enabling some species to talk to each other as well as humans.
- We will see the first hurricane stopped by human intervention.
- We will see wireless power used to light up invisible light bulbs in the middle of a room.

Relationships among Scientific Paradigms

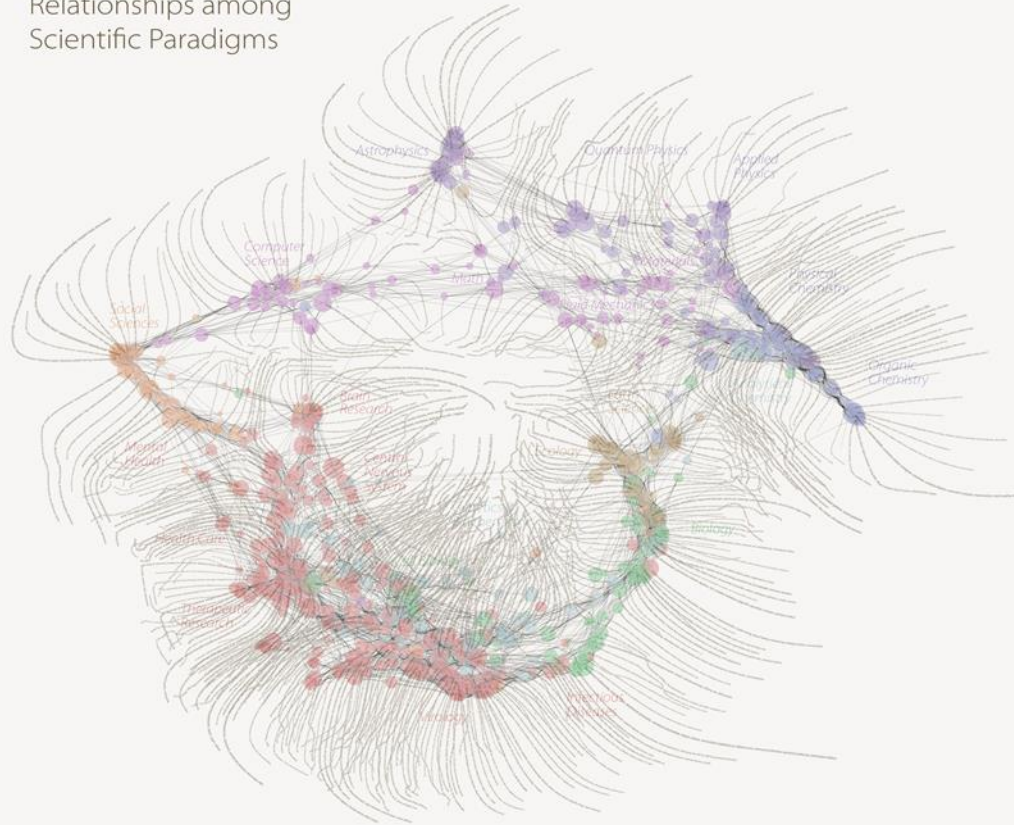


Figure 1: A network diagram illustrating the relationships among various scientific paradigms. The diagram shows a complex web of interconnected nodes, each representing a scientific field. The nodes are color-coded: purple for Physics (Astrophysics, Quantum Physics, Applied Physics, Physical Chemistry, Organic Chemistry), orange for Computer Science and Social Sciences, red for Brain Research, Mental Health, and Therapeutic Research, green for Biology and Medicine, and blue for Chemistry. The network shows a high degree of interconnectedness, with many nodes having multiple connections, suggesting a highly integrated scientific landscape.

“

Revolution doesn't happen when society adopts new technologies
- it happens when society adopts new behaviours.

Clay Shirky, Here comes everybody

Knowledge Doubling Curve (Buckminster Fuller)

Frem til 1900 ble menneskelig kunnskap doblet ca. hvert århundre

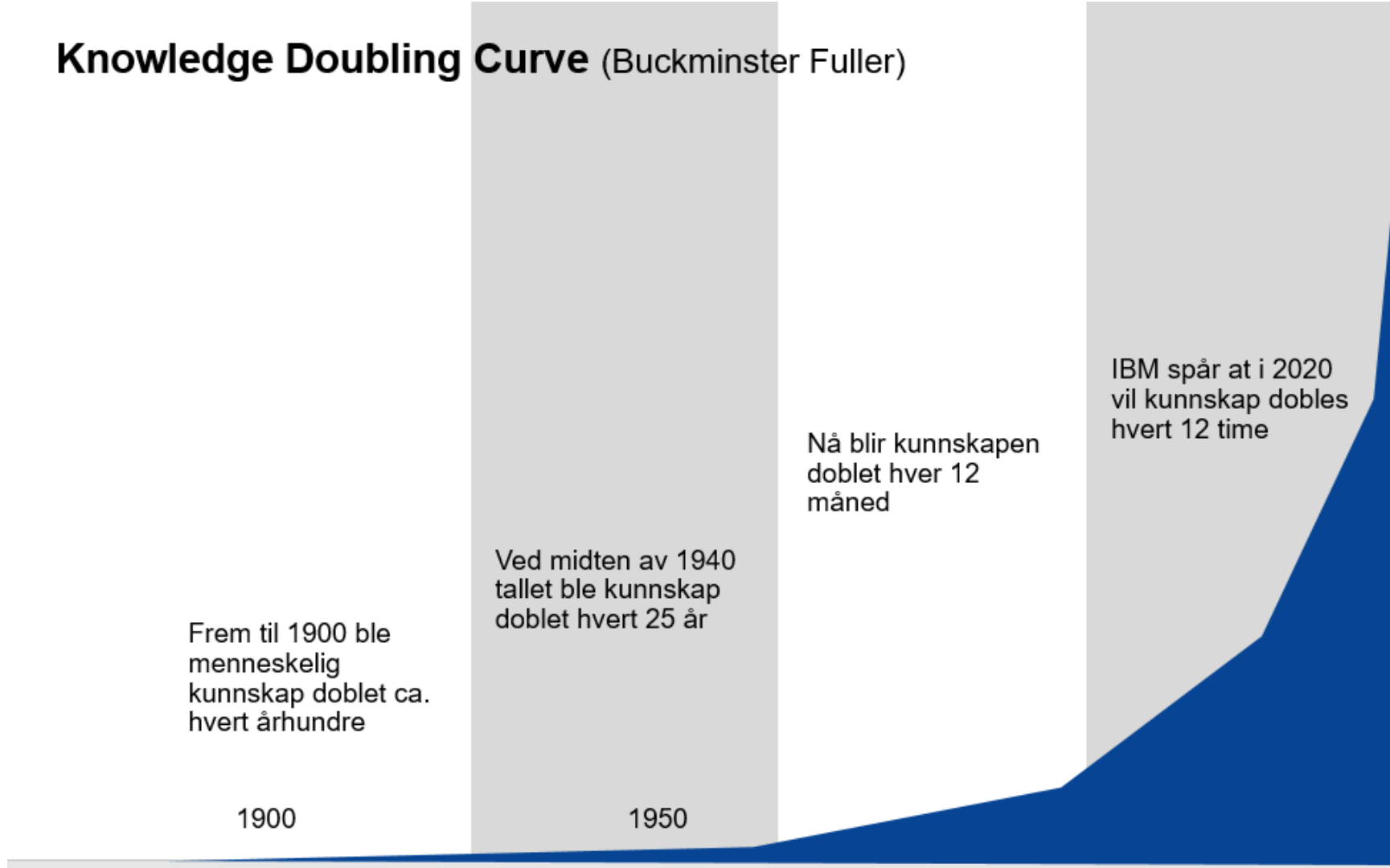
1900

Ved midten av 1940 tallet ble kunnskap doblet hvert 25 år

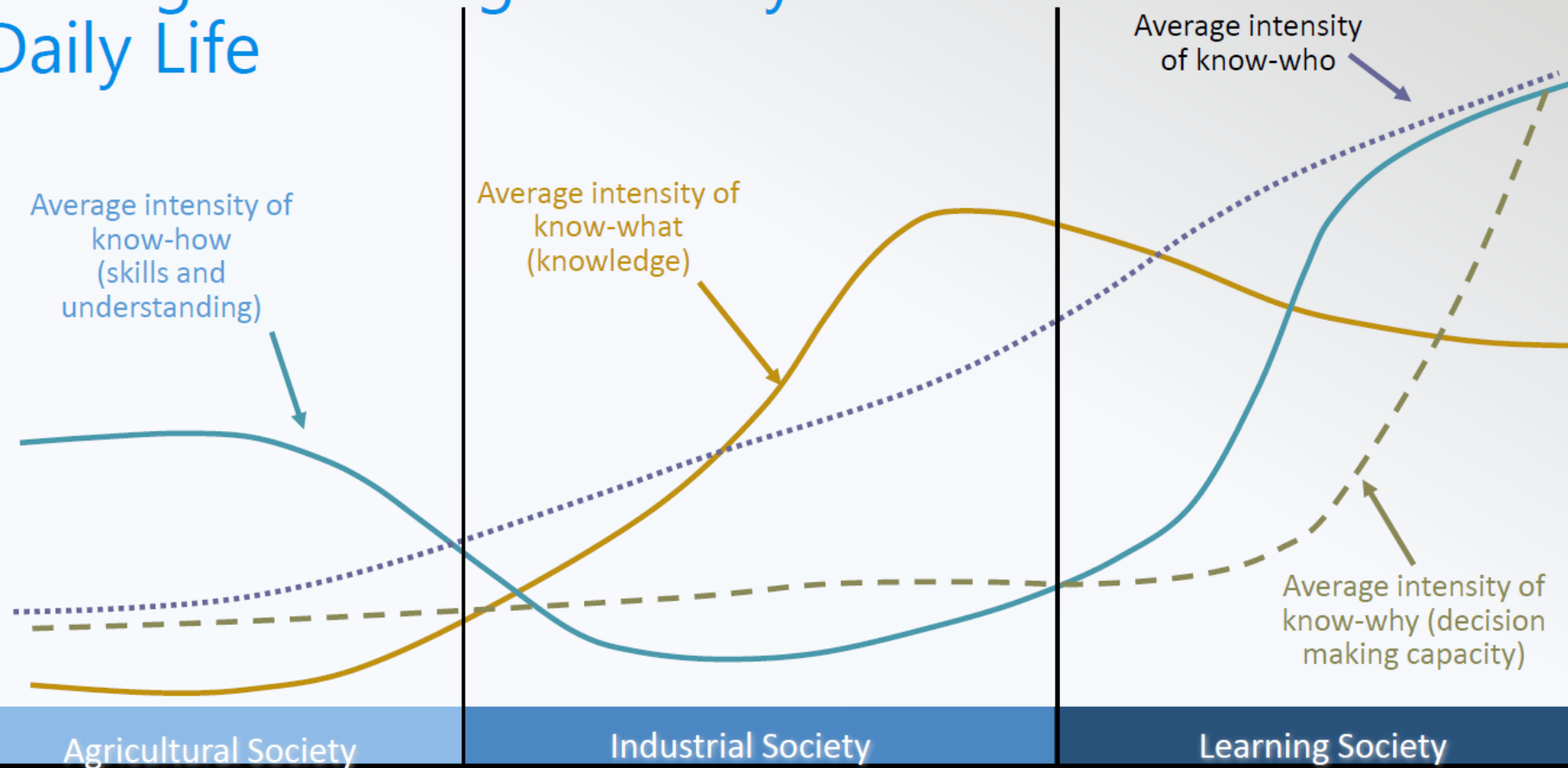
1950

Nå blir kunnskapen doblet hver 12 måned

IBM spår at i 2020 vil kunnskap dobles hvert 12 time

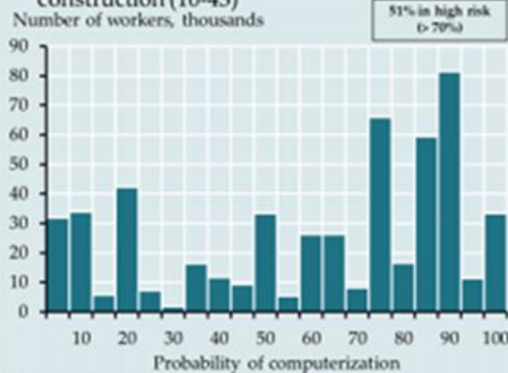


Average Learning Intensity of Daily Life



55

Norway: The distribution of occupational empl. over the prob. of computerization
Year 2013, Manufacturing, energy, and construction (10-43)



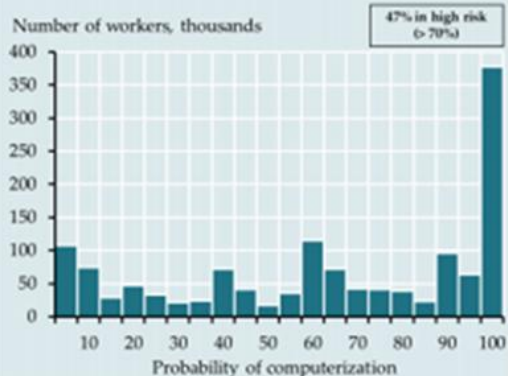
Data sources: Statistics Norway and Frey & Osborne (2013).

Automatisering og arbeidsmarkedet i Norge

..concluded that 33% of employment (...)is at high risk of being automated away over by 2030...

56

Norway: The distribution of occupational empl. over the prob. of computerization
Year 2013, Private Services (45-82)



Data sources: Statistics Norway and Frey & Osborne (2013).

“

Nye beregninger fra OECD viser at 10 prosent av jobbene i norsk arbeidsliv har høy sannsynlighet for å bli automatisert bort. Det er lavere enn tidligere anslag og på nivå med de fleste OECD-land.

Forskningsrådet
Indikatorrapporten 2017



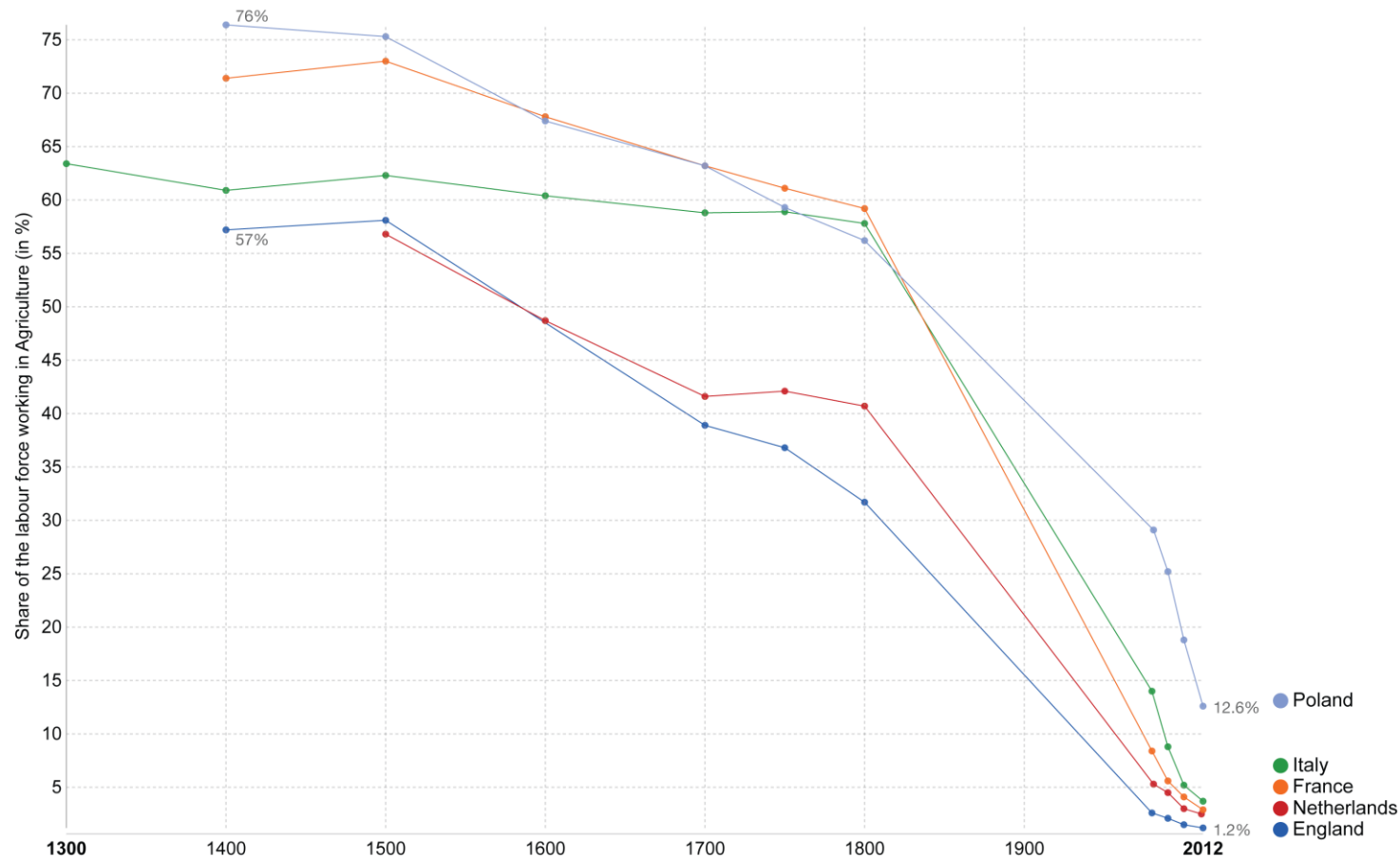
“

there is no sign of technology causing large scale unemployment or polarization. The second insight is that instead of job losses, there is a resulting need for new skills

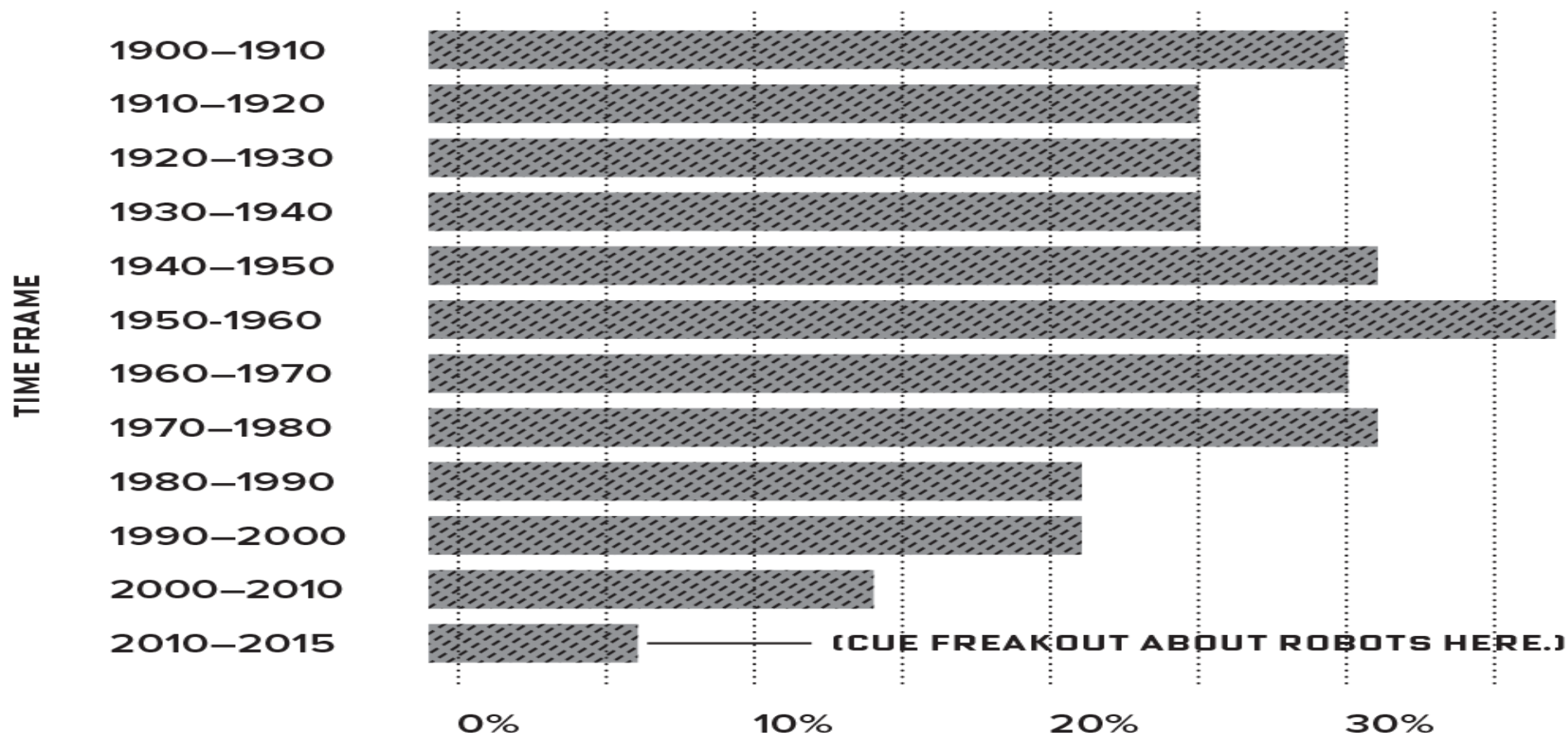
Erik Brynjolfsson, Director of the MIT Initiative for the Digital Economy

27 January 2017

Share of the labor force working in agriculture, since 1300 – By Max Roser



If automation were throwing masses of people out of work, you'd see lots of churn, or movement from job to job. But the rate of churn today is at a historic *low*.



“

By 2020, the US economy is expected to create 55 million job openings: 24 million of these will be entirely new positions

Georgetown's Center on Education

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The image shows the Panera Bread logo on a solid green background. The logo consists of a circular emblem at the top containing a stylized, flowing design that resembles a flame or a piece of bread. Below the emblem, the word "Panera" is written in a large, white, serif font. Underneath "Panera", the word "BREAD" is written in a smaller, white, sans-serif font, followed by a registered trademark symbol (®).

A word cloud featuring various futuristic job titles. The words are arranged in a roughly rectangular shape, with some oriented vertically and others horizontally. The colors used include white, blue, orange, and grey. The titles include:

- 3dfoodprinterengineers
- personalmentaltainer
- selfmanagementconsultant
- smartdustprogrammers
- cloneranchers
- nanomedics
- elevatedtubetransportengineers
- futorologist
- alcoach
- urbanagriculturalists
- personalteacher
- privatedatadetective
- dronetrafficcontroller
- DigitalDetoxTherapist
- ProductivityCounselor
- selfleader
- organisationflexibilitymanager
- teamfacilitator
- treejackers
- augmentedrealityarchitects
- avatarrelationshipmanagers
- newsciencephilosopherethicists
- smartcontactdevelopers
- culturecatalysator

The background of the slide is a photograph of industrial robotic arms in a factory. The arms are dark, metallic, and have various sensors and cables attached. They are positioned in a way that suggests they are working on a production line. The lighting is bright, and the background is slightly blurred, focusing attention on the robotic arms.

Deloitte.

From brawn to brains

The impact of technology
on jobs in the UK

“

If I had to do it over again, I would put more emphasis on the way technology leads to structural changes in the economy, and less on jobs, jobs, jobs. The central phenomenon is not net job loss. It's the shift in the kinds of jobs that are available

Andrew McAfee,

Seks kjappe

Hans Tormod Vike (44), eneeier

● **Hva var ideen da dere startet?**

- Jeg hadde ingen idé.

● **Hva ville dere gjort annerledes hvis dere fikk gjort én ting om igjen?**

- Ingenting.

● **Hva er deres viktigste drivkraft?**

- Det har jeg ikke tenkt over.

● **Hvordan merker dere oljesmellen?**

- Oljesmell? Det har ikke smelt hos oss.

● **Hva gjorde dere for ti år siden?**

- Gravde.

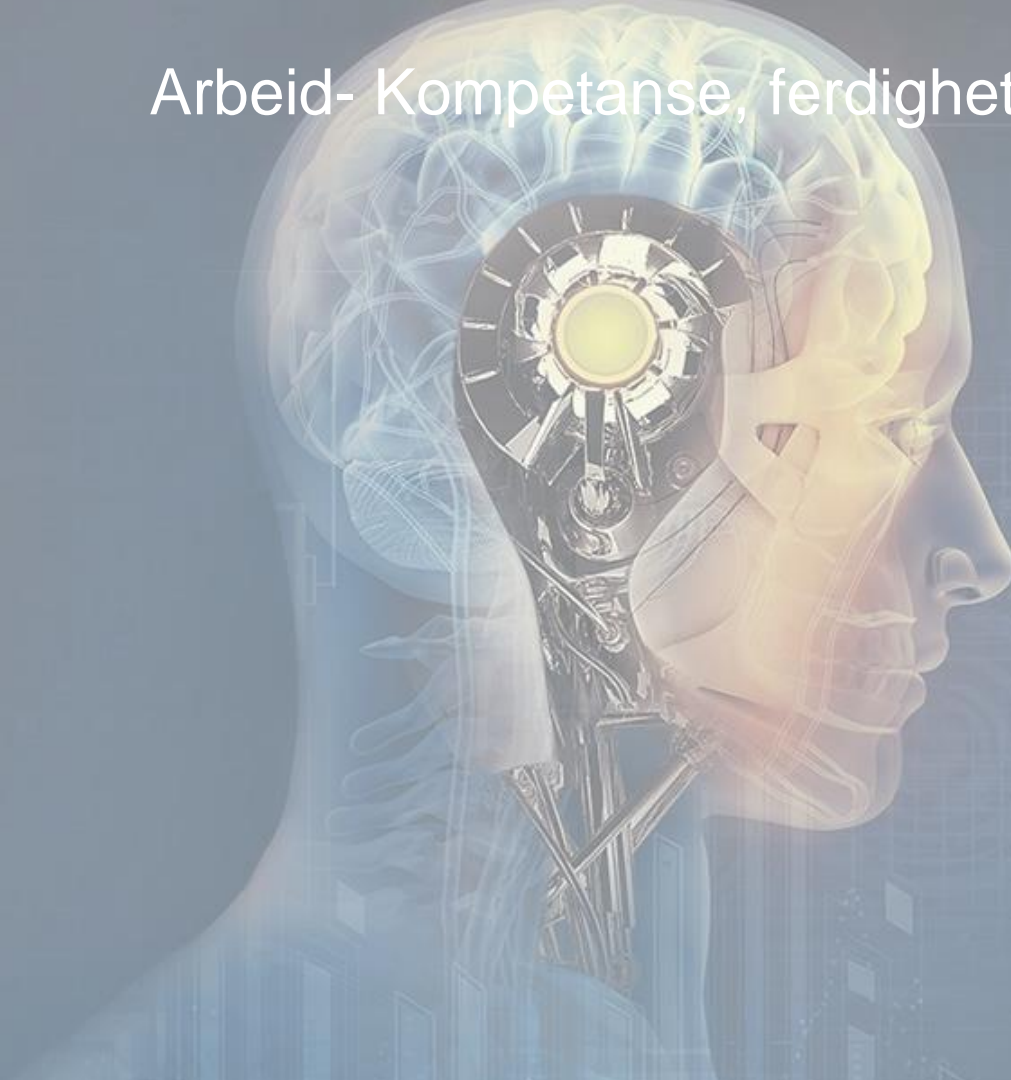
● **Hva gjør dere om ti år?**

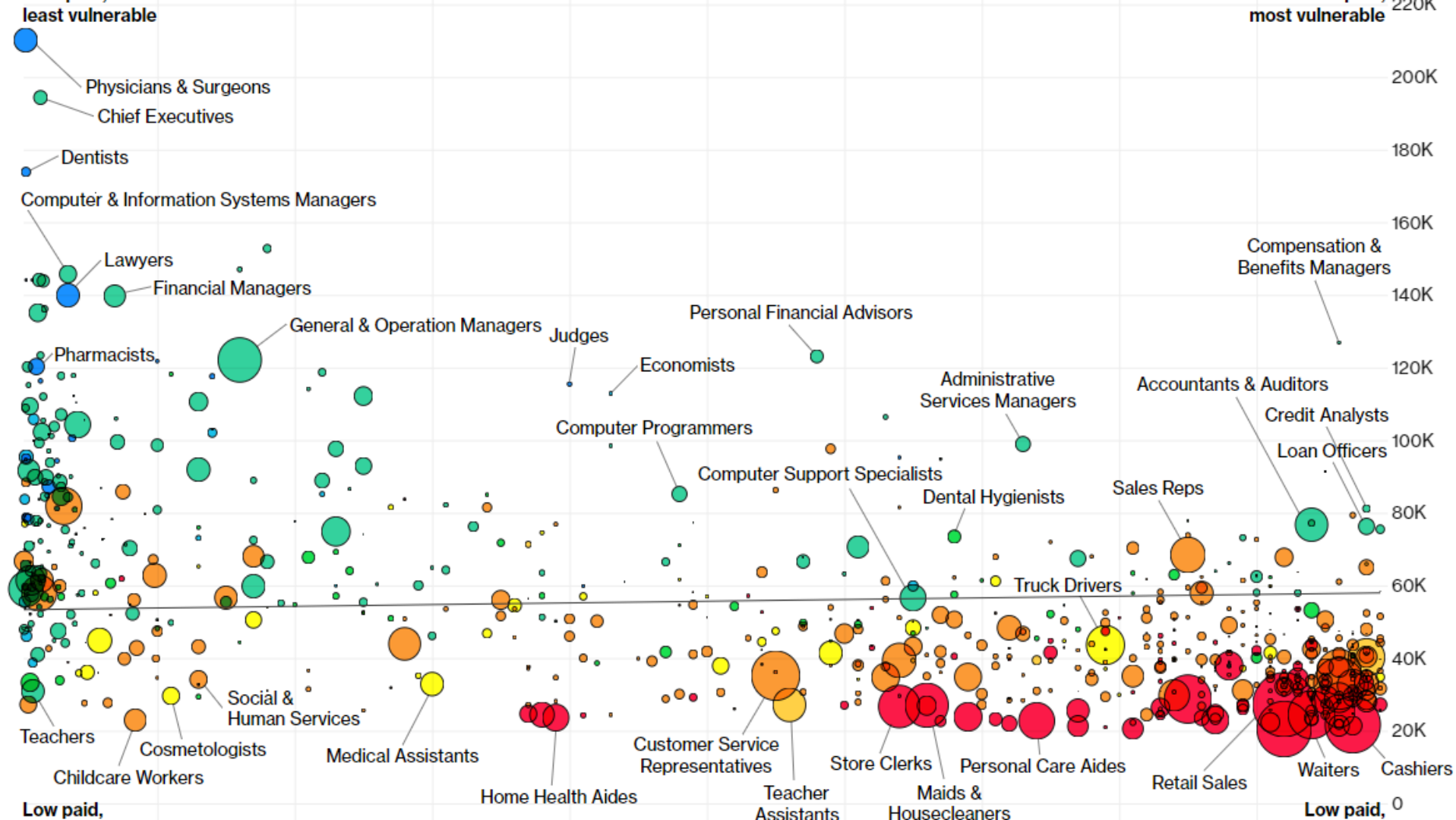
- Graver.

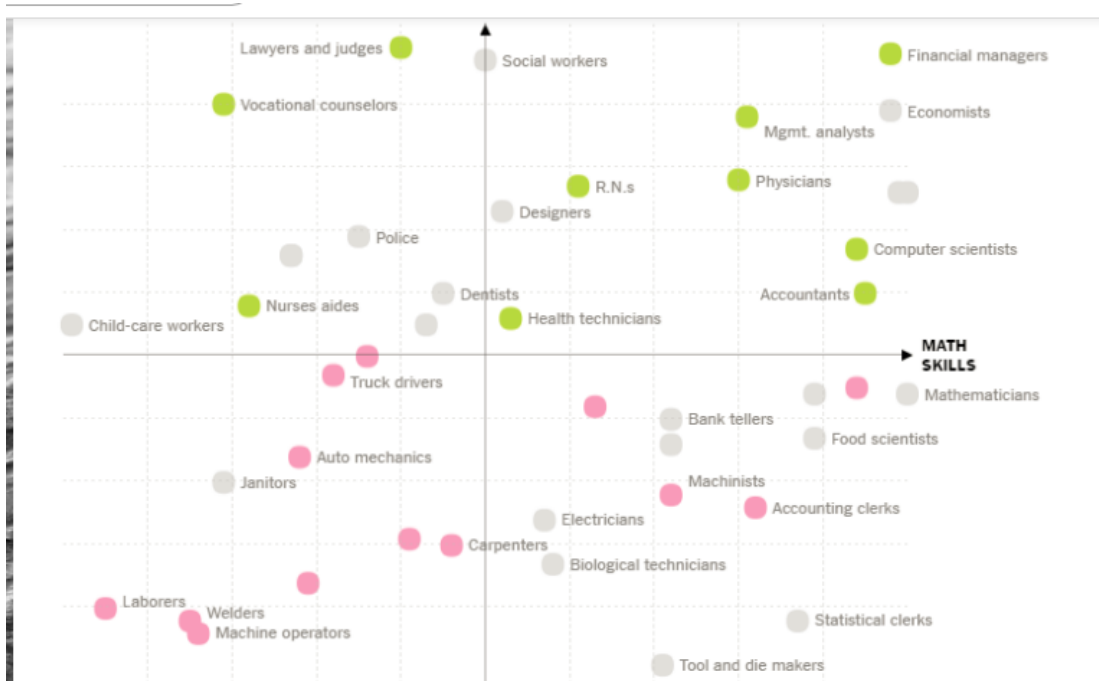
Fra DN:

Gravemaskin-gründer

Arbeid- Kompetanse, ferdighet , kunnskap







Source: David Deming, Harvard University

This chart is from the World Economic Forum's *Future of Jobs* study ([PDF](#)) so healthy skepticism and bullshit radars fully active. However I do like Stephen Downes' gloss:

[If we look at the chart] mathematical skills appear to be almost irrelevant, while the clear line of demarcation is the requirement for social skills. Keep in mind: computers do math. So if you do math, chances are than a computer can do your job.



JASON TANZ BUSINESS 05.17.16 8:50 AM

SOON WE WON'T PROGRAM COMPUTERS. WE'LL TRAIN THEM LIKE DOGS

Got a tip? [Let us know.](#)

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CRUNCH NETWORK

Please don't learn to code

Posted May 10, 2016 by [Basel Farag](#) (@Thisisacooking)

06.14.16 | THE FUTURE OF WORK

Why Coding Is Still The Most Important Job Skill Of The Future

Computer programming jobs may be declining, but coding is becoming the most in-demand skill across industries.



50% of all jobs in 2030 will require coding knowledge!



Global Agenda

Emerging Technology

Innovation

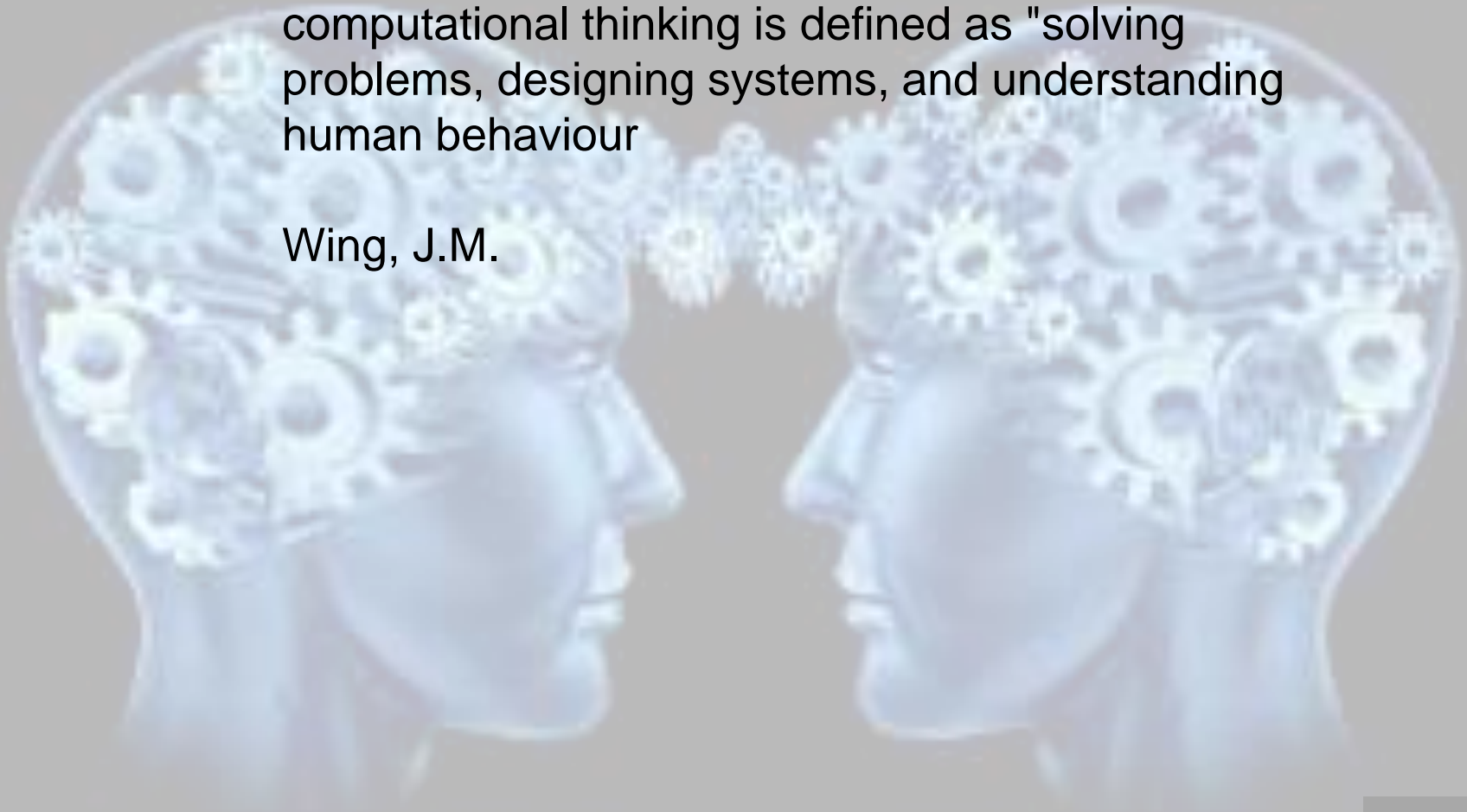
Science & Technology

Why experts have killed innovation



computational thinking is defined as "solving problems, designing systems, and understanding human behaviour

Wing, J.M.





Logic

predicting and analysing

Logic helps us to establish and check facts, and make predictions.



Abstraction

removing unnecessary detail

Abstraction is identifying what is important and leaving out detail we do not need.



Debugging

finding and fixing errors

Debugging is about finding out what is wrong in an algorithm or program and fixing it.



Algorithms

making steps and rules

An algorithm is a precise sequence of instructions, or set of rules, for performing a task.



Evaluation

making judgement

We use evaluation when we make judgements based on different factors, such as design criteria and user needs.



Persevering

keeping going

Persevering is never giving up, being determined, resilient and tenacious.



Decomposition

breaking down into parts

Decomposition is breaking a problem or system down into its parts.



Tinkering

experimenting and playing

Tinkering means trying things out through experimentation.



Collaborating

working together

Collaborating means working with others to ensure the best result.



Patterns

spotting and using similarities

By spotting patterns we can make predictions, create rules and solve other problems.



Creating

designing and making

Creating is about planning, making and evaluating things; e.g. animations, games or robots.



“

Alle jakter på det uspesifiserte «digital kompetanse». Det handler i bunn og grunn om å ha evne og vilje til å lære. Den kompetansen kan ikke kjøpes. Den må læres,....

- Gro Brækken,
generalsekretær for Norsk institutt for styremedlemmer
DN 09.01.2018



Generalsekretær Gro Brækken i Norsk institutt for styremedlemmer deltok på NHOs årskonferanse i Oslo tirsdag. Foto: Gunnar Lier

Nyheter Morgendagens næringsliv

Denne kompetansen jakter arbeidsgiverne på

Næringslivstoppene vet hvilken kompetanse de er ute etter, men råder likevel de unge til å velge med hjertet.

Christian Bjerknes , Marit Tronier Halvorsen , Anita Hoemsnes , Einar Takla og Jorun Sofie F. Aartun

Publisert: 09.01.2018 — 18:19 Oppdatert: 09.01.2018 — 20:03

SKILL

CAREER AREA

OVERALL

		Clerical & Administrative	Customer & Client Support	Design, Media & Writing	Engineering	Finance	Healthcare	Hospitality, Food & Tourism	Human Resources	Information Technology	Management & Operations	Manufacturing & Production	Marketing & PR	Personal Care & Services	Research, Planning & Analysis	Sales
Communication Skills	#1	#1	2	2	#1	#1	#1	#1	#1	#1	#1	#1	#1	#1	#1	#1
Organizational Skills	2	3	3	4	3	3	2	2	2	3	2	2	2	2	2	3
Writing	3	6	5	#1	2	4	3	4	5	2	3	3	3	4	4	4
Customer Service	4	8	#1	15	12	7	9	3	11	9	11	14	12	5	11	2
Microsoft Excel	5	2	9	9	8	2	12	16	3	10	6	6	5	16	3	9
Word + Office	6	4	8	7	5	5	10	13	4	8	8	5	9	15	7	6
Problem Solving	7	12	6	10	6	8	7	12	7	4	7	4	11	10	5	7
Planning	8	14	18	13	7	12	5	10	10	5	4	8	4	7	8	11
Comp Skills + Typing	9	5	4	17	10	10	4	8	12	24	14	7	17	9	16	8
Research	10	10	12	5	9	9	6	21	8	7	12	13	6	12	6	18
Detailed-Oriented	11	7	7	6	11	6	14	9	6	11	13	9	10	19	10	12
Building Effective Relationship	12	15	11	19	17	11	11	6	9	15	9	18	13	3	13	5
Project Management	13	24	24	11	4	17	19	37	14	6	5	12	8	29	9	22
Supervisory Skills	14	18	20	25	14	14	8	5	18	26	10	11	23	8	26	14
Multi-Tasking	15	9	10	12	19	13	15	11	13	13	18	15	16	18	14	13

<http://burning-glass.com/graphic-whats-the-most-important-baseline-skill-it-depends/>

Intelligens og bevissthet



Ole Martin Skaug



“

Dannelsen det vi sitter igjen med etter at
vi har glemt det vi har lært.

- *Ellen Key*



slutninger
bevissthet
tenker
sammenhenger
ikke rasjonelle
rasjonelle
ting
mønstre
verbale

påvirker fortløpende
avventende
tidløse visuelle
syntetiserende
lineære
samspelet
forestillinger
helheten
forhold
forhold
kontinuerlig
rommessig
avvikende fakta
sammenfallende
kled
analogiske
ufullstendige
strukturerte
avhengig
teoremer
oppleve
innsikt
konkrete
konklusjon
spåsbale
argumenter
intuitive
heheter
logiske
digitale
trakte
ord
del
enkelte
beskrive
betegneskiler
følger
representerer
prioritet
presentere
oppmerksomhet
sammenfallende
helhetlige
sannsynlige
synsmessige
regelmessig
befinner
likheter
opplevelse
forneft
fornuft
enveit
slutter
hendene
tegnsekvenser
matematiske
verdier
utdrag
formul
numeriske
forholde
våken
overfører
tåkeledd
rekker
definerte
symbolske
tegnsekvenser
våre
slutninger
våre
slutninger

Alice Cooper



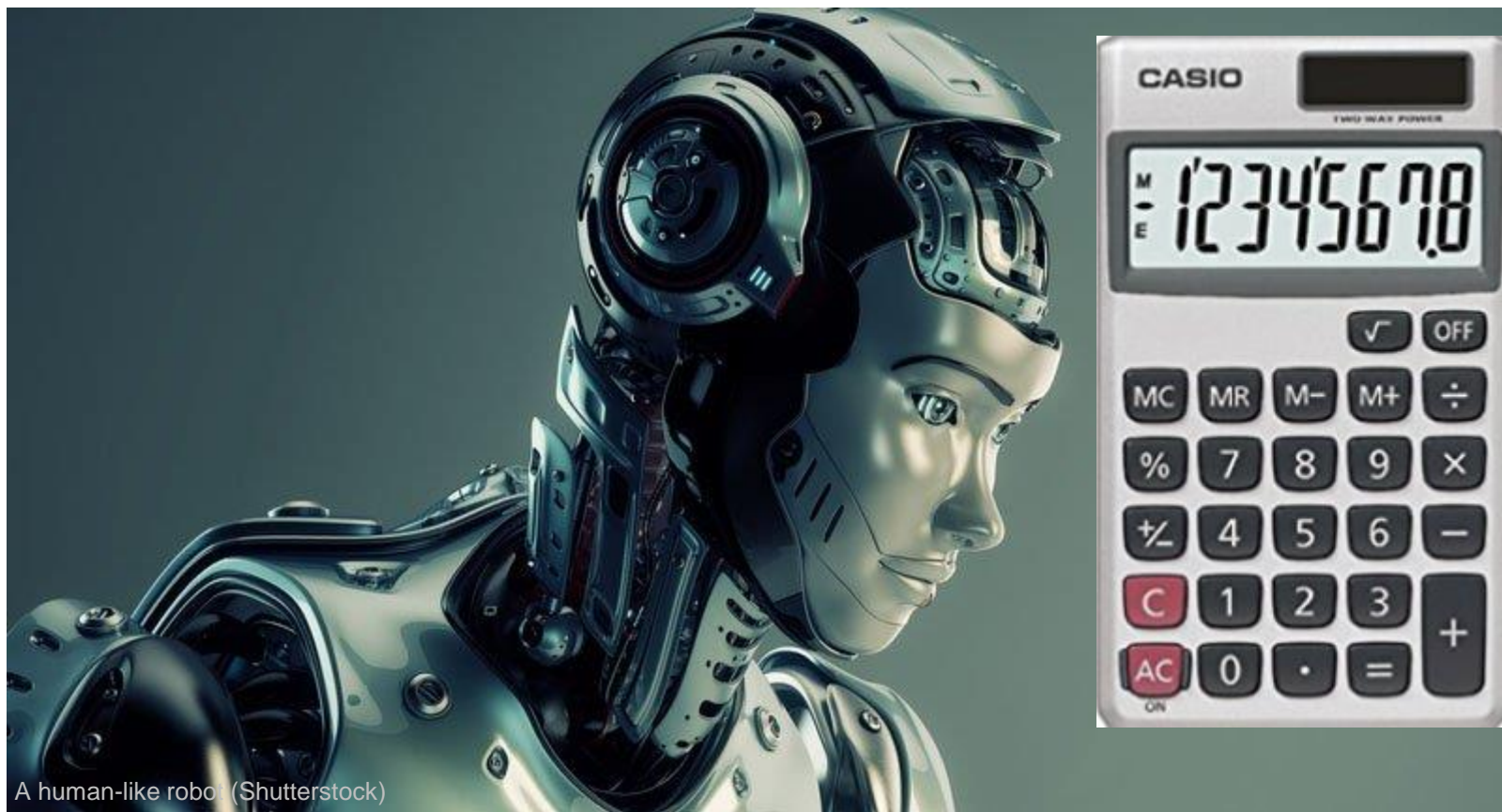
Erik Satie Gymnopedie



“

*Nobody knows what we do or how to
define a series of steps which
correspond to something abstract like
thinking*

- *Richard Feynman*
Physicist



A human-like robot (Shutterstock)

Why Daydreaming Is a Virtue ★

🕒 Over a year ago

by ORION JONES



Soft skills “worth £88 billion” to UK economy

By Jo Faragher on 1 Jul 2015 in Emotional intelligence, Learning & development



One of Britain's Largest Companies No Longer Wants to Know Where Its Applicants Went to College

Paul Petrone December 8, 2015

in Share 723 Tweet Like +1 7



Hegnar.no

NYHETER MARKED FORUM TJENESTER TV EVENT

- Vi ser etter helt andre folk

Nå får økonomene konkurranse av designere, latinstudenter og kreative it-hoder.



BBC

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Are you positioned for a career that intersects health and legislation?

Education & Family

Penguin scraps degree requirement

By Sean Coughlan
Education correspondent

© 18 January 2016 Education & Family



NHH-studentene vrakes

- Det vi lærer på NHH nå, er det vi trengte for ti år siden

Talent Utdannelse



Nå ansetter ikke byggebransjen bare ingeniører - de leter også etter gamere

av 3D, VR og Hololens på

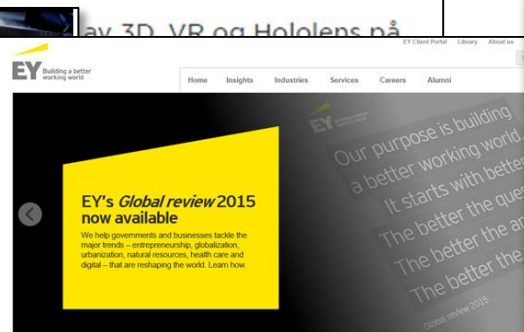
Visma vil heller rekruttere studenter fra NTNU enn fra Handelshøyskolen

Mens firmaet for rekrutterte studenter fra Norges Handelshøyskole, er det nå mer interessert i å ansette studenter fra NTNU eller KTH i Stockholm.



ØKER OG ØKER: Tallet på Adobes apper og programmer for Windows- og Mac-pc-er bare fortsetter å Lamkin, sjef for digitale medier hos Adobe. (Foto: Toralf Østvang)

- Ledere må forstå kreativitet



News

Views

EY receives two SAP Partner Excellence Awards 2015
SAP recognizes EY for services innovation in North America and for fast-growing on-premise and cloud business services in EMEA/EMEA.



Accelerating growth and making it sustainable
In this issue of Exceptional we hear stories from high-growth companies and game-changing entrepreneurs about how they've managed resources to achieve their business growth.



Adm dir. Elvind Bøe i Randstad er ikke i tvil om at arbeidslivet krever mer av både ledere og arbeidstakere. Foto: Ellen Høyland

Jobb og ledelse Arbeidsliv

- Det nytter ikke å komme ut i arbeidslivet med en fancy mastergrad hvis du ikke klarer å levere

Our locations

“

...Microsoft employees are no longer supposed to prove they're the smartest people in the room, but are instead supposed to "learn and bring out"

Kathleen Hogan
HR director Microsoft

“

This is quite a shift from the company whose founding CEO, Bill Gates, was known for disagreeing with some ideas by saying "that's the stupidest f---ing thing I've ever heard."



I februar 2015 besøkte Erna Solberg, Siv Jensen, Trine Skei-Grande, Knut Arild Hareide og kunnskapsminister Oslo og Akershus som tok videreutdanning i naturfag. Landets høyere utdanningsinstitusjoner er ikke rigget for å gå ut på dato», mener NIFU. Foto: Sonja Balci



DIREKTØR
SVEINUNG SKULE
NIFU



FORSKER 1
CATHRINE TØMTE
NIFU

«Gått ut på dato?» Universiteter og høyskoler er for dårlig forberedt for den neste store utdanningsreformen, skriver Cathrine Tømte og Sveinung Skule ved NIFU.

«Vi må forberede oss på en helt ny fremtid der digitalisering skyter fart på utviklingen i arbeidsliv og samfunn for øvrig. Mange av oss må derfor fylle på utdannelsen, eller kanskje til og med ta en helt ny», sa Erna Solberg i sin ny og lovet å legge til rette for at «ingen skal gå ut på dato i det norske arbeids-

Kunnskapsministerens signal om at livslang læring blir den **neste store reformen i utdanningssystemet**, er altså forankret helt til topps.

Men hvor godt er universiteter og høyskoler i stand til å realisere statsministerens planer? Mye tyder på at de har et godt stykke igjen.

I motsetning til hva de fleste tror, er det i følge SSB en stadig mindre andel sysselsatte som deltar i formell videreutdanning ved universiteter og høyskoler. I 2011 til 2017 falt andelen i akademiske yrker og høyskoleyrker som deltar i videreutdanning betydelig - fra 11 til 7 prosent. I samme periode var andelen deltok i jobbelatert opplæring nesten uendret.



DÅRLIGE FORELESNINGER: Kanskje problemet i dagens system ikke er studenter med for dårlige forkunnskaper, men forstokket evnet å følge med i tiden, skriver professor Jan Ubøe. FOTO: ANETTE KARLSEN

Selv de gode forelesningene er for dårlige

Det er mulig jeg er stakk dum, men selv kort tid etter svært gode forelesninger, husker jeg knapt noe av det som ble sagt.



JAN UBØE
Professor i matematikk, NHH





client req

tailor templates which are
struggles and comparisons on
salary and structure.

validation
system
that can
give
insight on
salary
and other
things.

Job Details Recommendation

informing the live ledger based on the
employer input (structured or structured) the
system references the Live Ledger and
other data sources to recommend the best
combination of skills and job categories to
produce the best recommendations.



government
disclosure
means based
emp disclosure
how to provide
better insight and
details information
etc.

program specific
current wage
regulatory
programs then we
change a model.

Structured Job Data

for CS3 platform collects job
postings from member employers,
also use the platform. They are
avoided through the job creation
process.



Live Job Data

for CS3 platform collects live job
posting data from the internet,
longtail company websites and
social media.



Preprocessing

the live job data is preprocessed
to pull out relevant meta data,
remove unwanted words/phrases.

AI Matching

using a latent categorization
model, each job is matched to the
outside vip24 interest scores.



Employer Gap Analysis

In parallel to the jobmatch process, the
employer will be provided gap analysis
in relation to the targeted hire. Examples
include paid issues with similar hires,
alternatives and people within the present
organization which could fill the role.

setup the branches in the dataset from up2 etc to provide the central analysis engine

Manual Training

Skills/Categories
which fall below a
certain confidence
level or association are
flagged for manual
intervention. These are
often emerging skills.



Associations

Based on the source document - Job
description, CV/Resume, Course, O'Net
or other content, skills are clustered and
given context associations. Out of this job
family/categories are dynamically created
based on these associations.

Adjustment

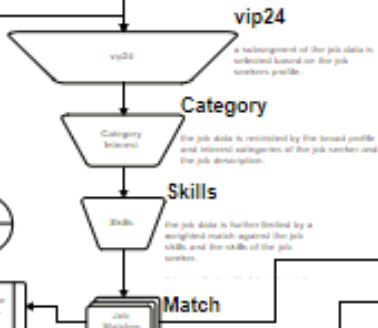
Based feedback from the results of the
process (e.g. task training scores, and
was found in that area). The associations
are weighted as necessary to influence
rankings.

Live Taxonomy

Taken together the skills, associations,
and categories form a live, dynamic
taxonomy of jobs. It also provides a
development framework and structure.

Start of Job Matching

The resulting structured, clean data is used for
matching against the job seekers details.



Alternative Recommendations

Based on the final matches, the system will
provide alternative recommendations to
boost the number of matches, leads to the
skills, categories.

The employees can also manually
override the system and add/change the
skills/categories and the recommendations
will adjust.



Match

The result is a selection of job
recommendations displayed to
the job seekers.

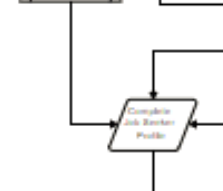
Rating

The employee can then provide
feedback on each
recommendation and rated or
reject them for further interaction.



Job Seeker

Job seekers start the process by
completing a set of profiles called
vip24 and uploading a
CV/Resume Profile or inputting
manually.



Verification

Based on the 3rd party
verification of skills, categories,
additional content, skills, etc will
be matched and recommended to
the job seekers.



Feedback

Feedback ratings from the
system and HR tasks, and other
integrations will be feedback to
the job seekers and future job, skill
and source recommendations.

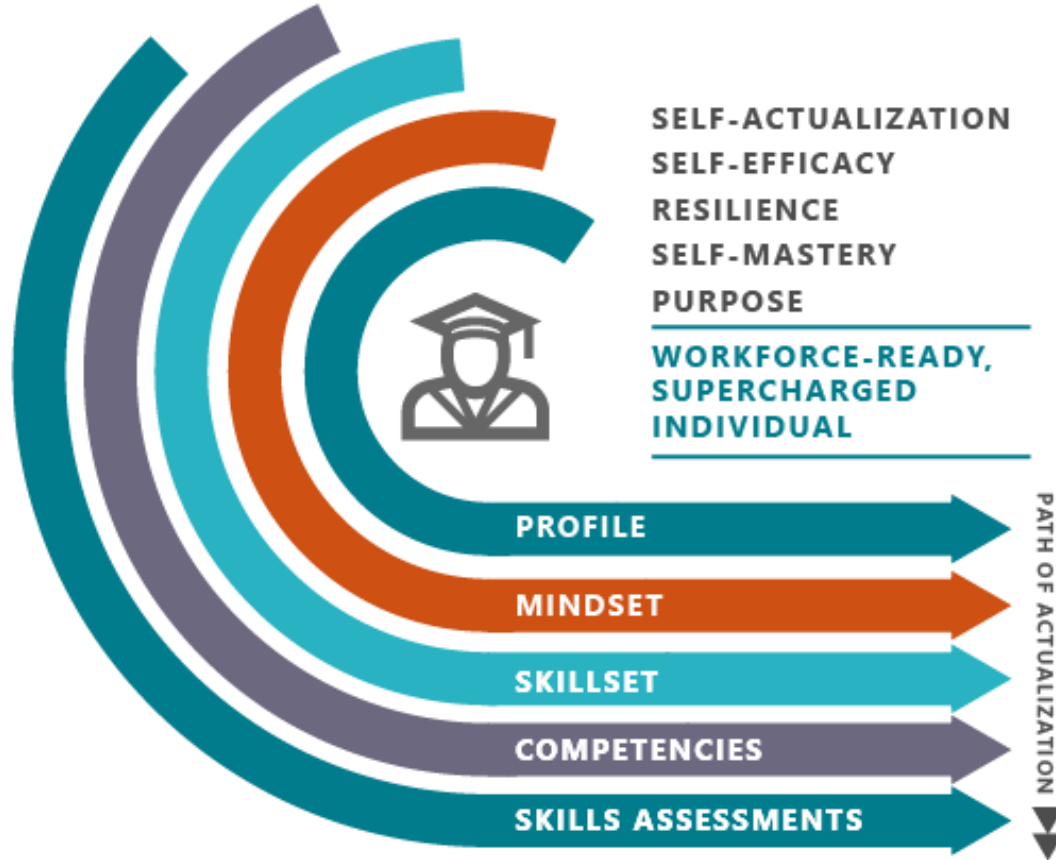


Event Tracking

All interactions are tracked back



empower graduates to become workforce-ready through lifelong learning skills



“

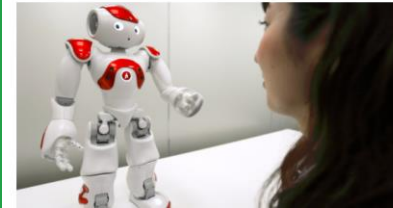
We can't lose the human element in technological advances or we risk losing the values that anchor our lives. For example, our students need to think hard about the balance between rule-based algorithms and human judgment.

-Bill Boulding, dean of Duke University's Fuqua School of Business in North Carolina

How Artificial Intelligence Will Impact Business Education In 2018

Robots will find a place on MBA syllabi and change the way we learn online, according to the world's top deans

Written by Seb Murray 15 Jan 2018 Making The Headlines



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Når vi vurderer studenters utdanningsvalg ut ifra samfunnets nytte, jager vi et mål i bevegelse. Det er få på jorden (eller andre steder) som kan spå hva som er nyttig i en tenkt fremtid.

- Aksel Kjær Vidnes, 06.01.2015

Forskerforum

Nyheter Reportasje Kritikk og debatt Arkiv

Kronikk Leserinnlegg Anmeldelser





Takk.

Hans Petter Røkholt
Produktdirektør
Conexus

conexus

Grønland 67, 3045 Drammen / Tlf 02182 / www.conexus.net