

Underviseren som ikke liker å undervise

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Sansing

Abstraksjon

Følelser

Analyse

Prosesser

Resultater

Ekstrovert

Introvert

Myers-Briggs personlighetstyper

«Underholderen»

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«Forskeren»

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Foto: Woomiusee

Improved Learning in a Large-Enrollment Physics Class

Louis Deslauriers,^{1,2} Ellen Schelew,² Carl Wieman*†‡

We compared the amounts of learning achieved using two different instructional approaches under controlled conditions. We measured the learning of a specific set of topics and objectives when taught by 3 hours of traditional lecture given by an experienced highly rated instructor and 3 hours of instruction given by a trained but inexperienced instructor using instruction based on research in cognitive psychology and physics education. The comparison was made between two large sections ($N = 267$ and $N = 271$) of an introductory undergraduate physics course. We found increased student attendance, higher engagement, and more than twice the learning in the section taught using research-based instruction.



Deslauriers L, Schelew E, Wieman C. 2011. Improved learning in a large-enrollment physics class. *Science* **332**: 862-864.

Carl Wieman

Stanford

Stanford



1891 - 2016



1891 - 2016

Stanford

stanford



Carl Wieman

“**Universitetsprofessorer** forkynner et budskap om å søke sannheten gjennom observasjoner og grundige eksperimenter men når de går inn i **klasserommet** så bruker de metoder som er **utdaterte** og **ineffektive.**”

Ta med **forskerhodet** inn i **auditoriet** også!

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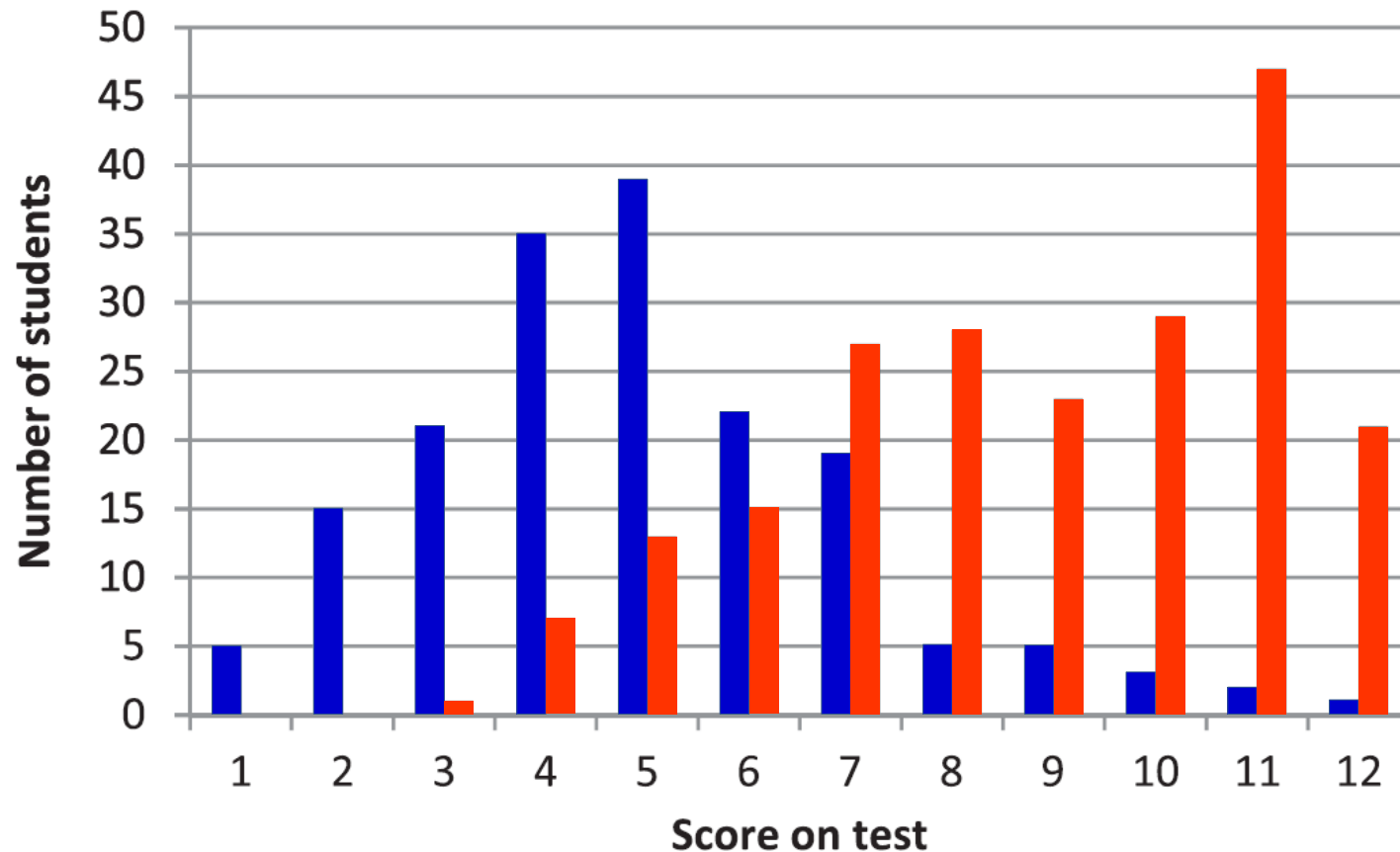
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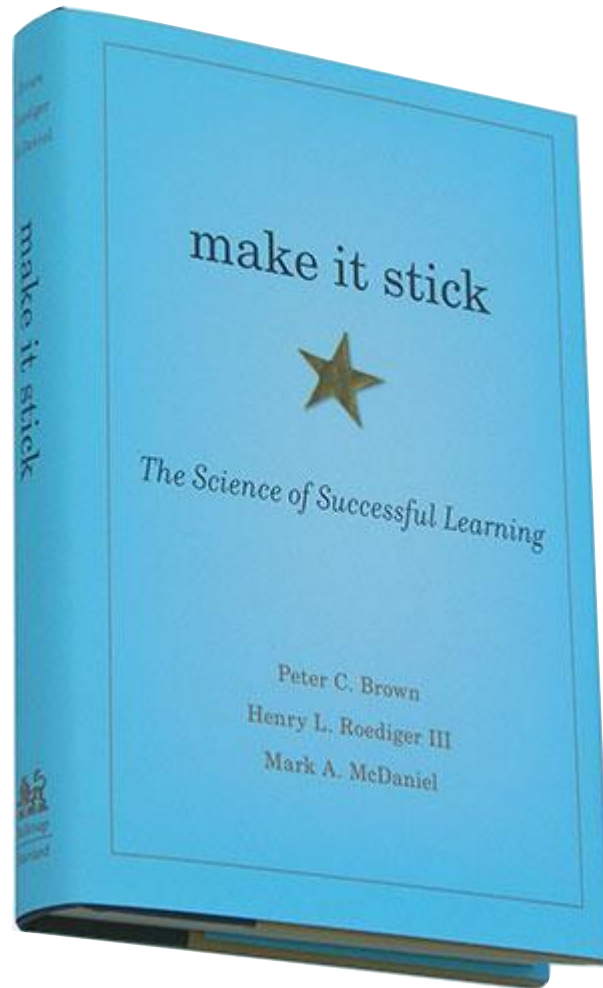
Tradisjonell forelesning med
den mest populære foreleseren

Aktive læringsmetoder
med en uerfaren postdoc

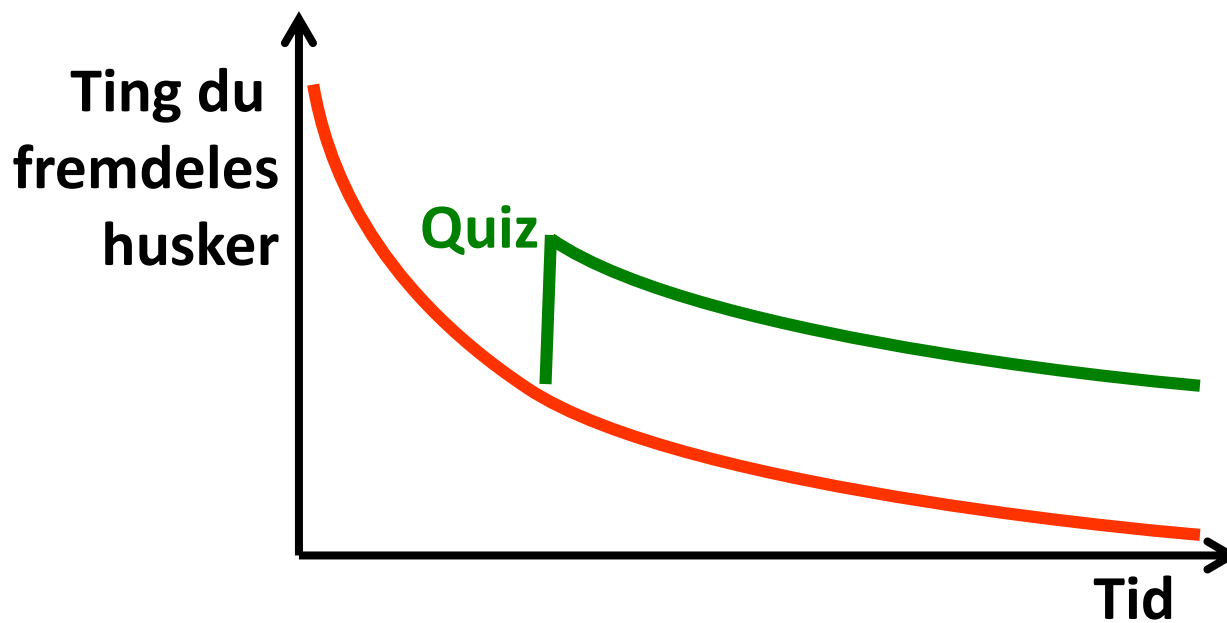
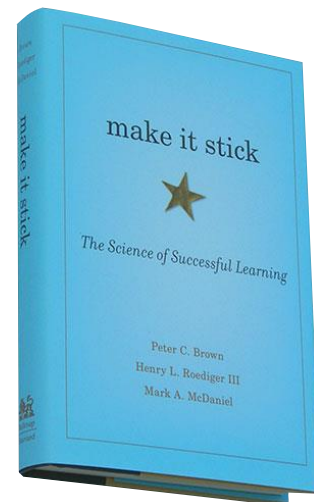


Make it stick

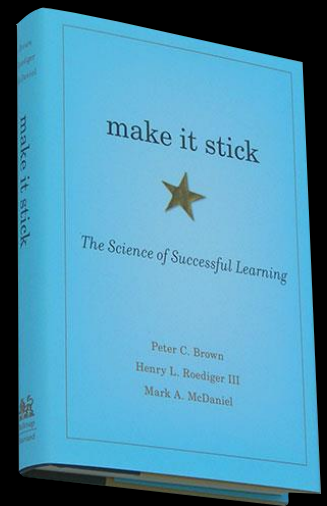
-The science of successful learning



“Et av de mest oppsiktsvekkende funnene i læringsforskning er effekten av **testing**.”

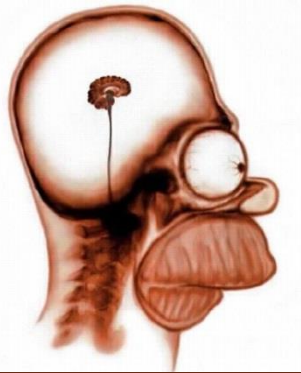
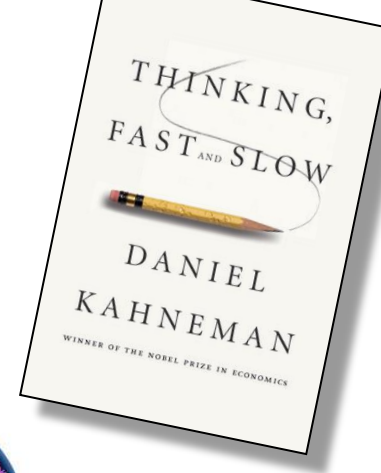


Studentene foretrekker
undervisningsmetoder
som er **behagelige**
men som de **ikke lærer av.**





Daniel Kahneman



System 1 – Intuisjon

- Overvåkning, kontekst.
- Mange sanser.
- **Foreslår** løsninger.
- Påkaller oppmerksomhet.

System 2 – Rasjonalitet

- Er logisk, krever **tenkning**.
- Energikrevende, man blir **sliten**.

En bok og en blyant koster
til sammen 11 kroner.
Boka koster 10 kroner mer enn blyanten.
Hva koster blyanten?

Studenter på **Princeton University**, 3 oppgaver

- Med **tydelig skrift**: 10% hadde alt rett.
- Med **utydelig skrift**: 65% hadde alt rett!

Når det er utfordrende å lese
aktiverer hjernen **rasjonaliteten**,
som avslo det gale svaret foreslått av **intuisjonen**.

Kognitiv belastning, uansett årsak, mobiliserer rasjonalitet.



Movement across cell membranes

1. Determine which of the following methods of transport is best to move the molecule described across the cell membrane – diffusion, facilitated diffusion-channel protein, facilitated diffusion-transporters or active transport
2. Draw a figure that demonstrates how the molecule moves across the membrane.
3. Label the hydrophilic and hydrophobic regions of the membrane, any proteins involved, and the direction of movement. Be sure that it is clear in your drawing, which side of the membrane has a greater and a lesser concentration of the molecule.

<http://www.bwbr.com/portfolio/a-glenn-hill-center-for-stem-education/>
North Dakota State University

Tips for å komme i gang

Fellesnevner for mye av det som funker:
studentene må **generere** kunnskapen de har.

To enkle former for aktiv undervisning:

1. **Stopp** forelesningen ti minutter før.
2. Be studentene **skrive ned** det de har lært i dag.

1. **Vis en figur** du pleier å vise i en forelesning.
2. **Be studentene forklare den** i stedet for at du gjør det.

Klasseromsdialog

Alle svarer.

Studentene får
umiddelbar **feedback**:

- dopamin,
- eget nivå.

Just-in-time teaching:
hva er det studentene
strever med?



Photo: Paul Sigve Amundsen

John Biggs

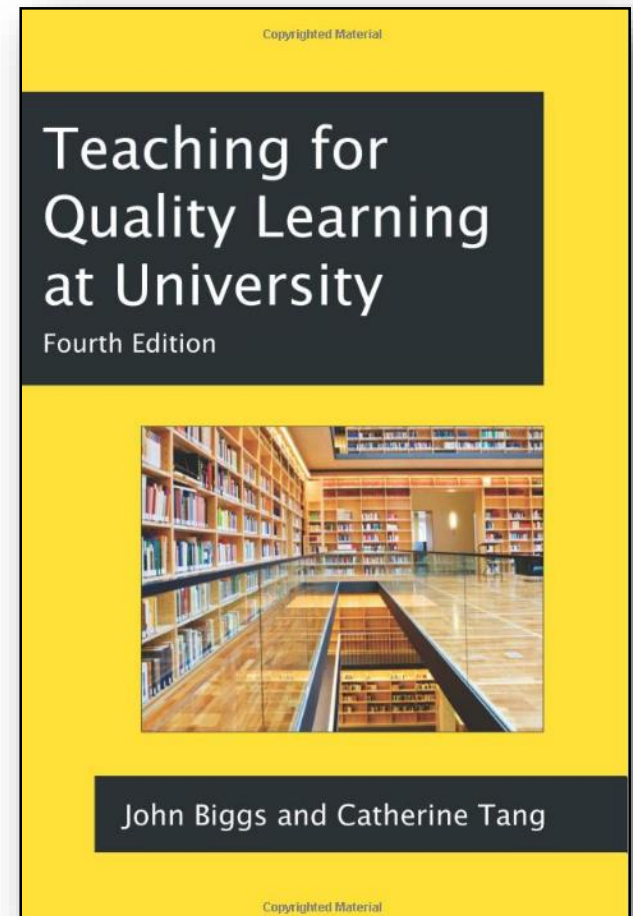
Nivå 1. Hva **studenten er**.

«Skyld på studentene».

Nivå 2. Hva **underviseren gjør**.

«Skyld på læreren».

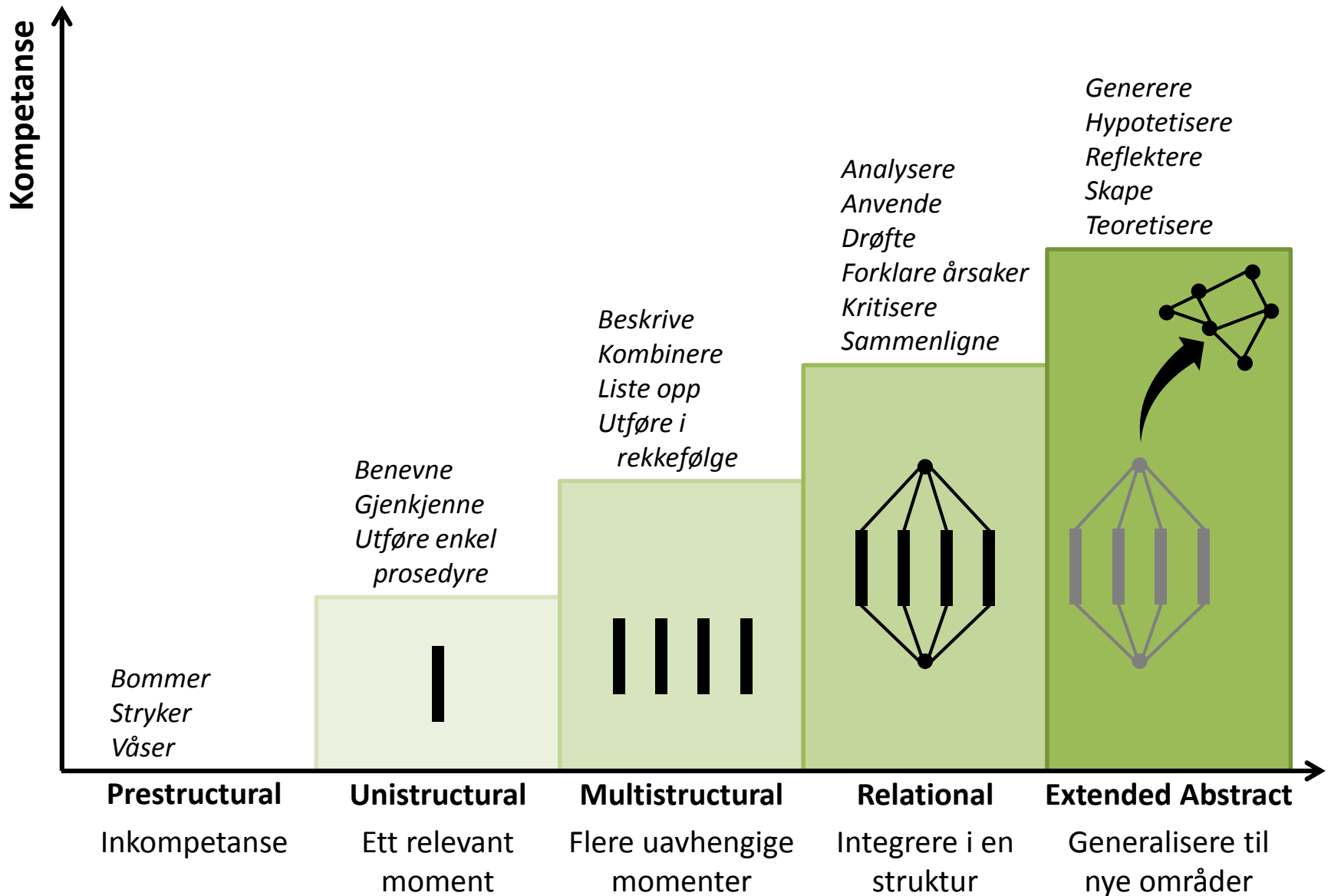
Nivå 3. Hva **studenten gjør**.

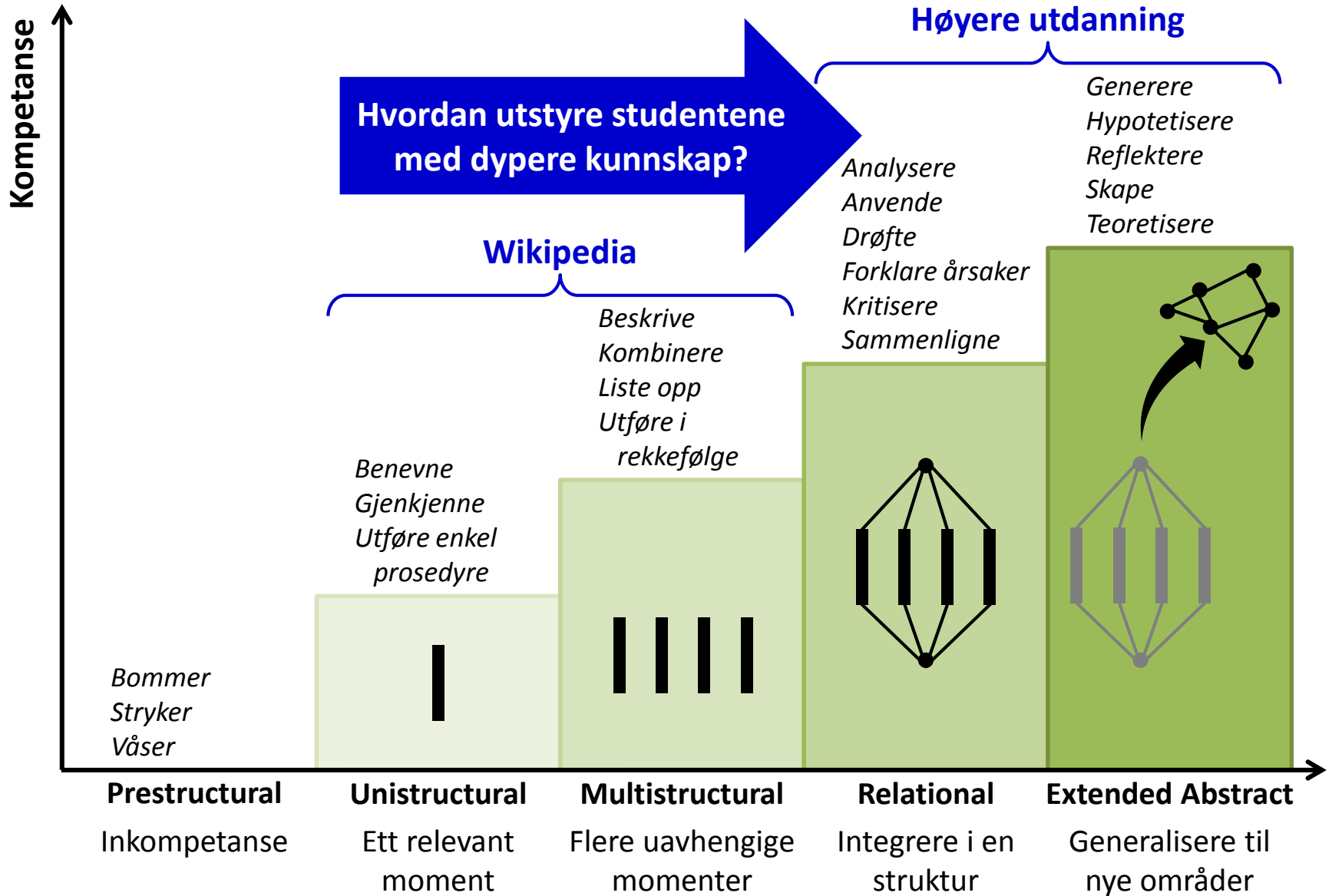


Analyse av moderne høyere utdanning – utfordringer og løsninger!
Tankegangen bak hele Bologna-reformen.

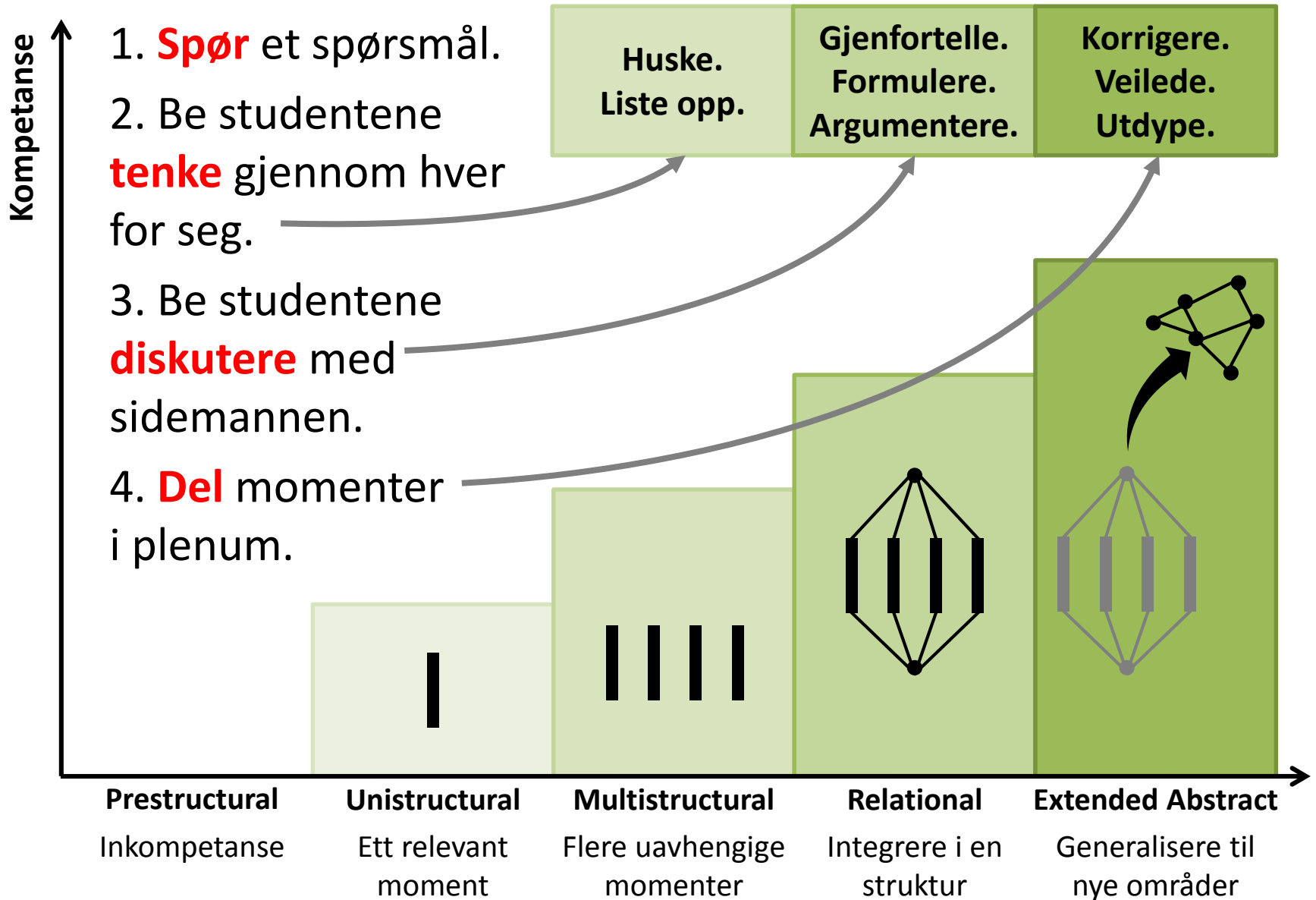
[Om du ikke har tid, les **kortversjonen**: John Biggs. 1999. What the student does: Teaching for enhanced learning. *Higher Education Research & Development* **18**:57-75.]

Biggs SOLO taksonomi





Think, pair, share



A dark tunnel with a bright light at the end, symbolizing a path forward. The light is a bright, circular glow at the far end of the tunnel, illuminating the path ahead. The walls of the tunnel are dark and textured, and the floor is also dark. The overall atmosphere is one of mystery and hope.

**Aktiv
undervisning**

**Digitale
verktøy**

Læringsutbytte-
beskrivelser

Underviser: Hvilke læringsaktiviteter gjør
at studentene **behersker læringsmålene?**

Eksamen

Student: Hvilke læringsaktiviteter
gjør at jeg **behersker eksamen?**

Får vi dette på
eksamen?



Biggs' metode: Constructive alignment

Læringsutbytte-
beskrivelser

Underviser: Hvilken vurderingsform
tester læringsmålene?

Eksamen

Student: Ved å beherske eksamen
oppfyller man læringsmålene!



«Underholderen»

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«Underholderen»

Et
uoppnåelig
ideal...

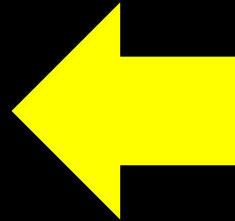


«Forskeren»

Konkrete triks
gir ønsket effekt.



**Skru PÅ
rasjonaliteten!**



«Forskeren»

**Konkrete triks
gir ønsket effekt.**

**Fokus på innhold,
ikke foreleseren.**



