

James D. Watson

**Knowing WHY**  
**is more important than**  
**learning WHAT**

Dagfinn Moe SINTEF Teknologi og samfunn  
Den nasjonale føreropplæringskonferansen 2013

# «AVOID BORING PEOPLE»



RISIKO

MESTRING

LÆRING

Mot i brystet, **vett i panne**,  
stål i ben og arme.  
Slike gutter det vil gamle Norge ha.



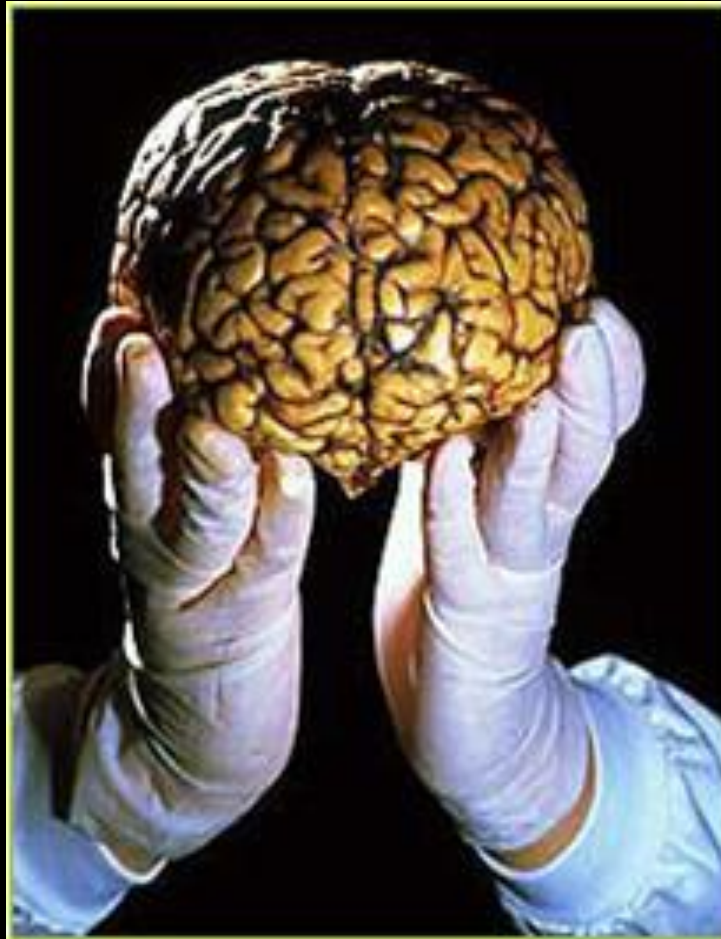


- KJÆRE STATEN,  
PASS PÅ MEG OG MOR  
OG FAR, OG AT HUNDEN  
IKKE SETTER BEINET  
FAST I HALSEN.





«Å forstå mennesket er å forstå hjernen»

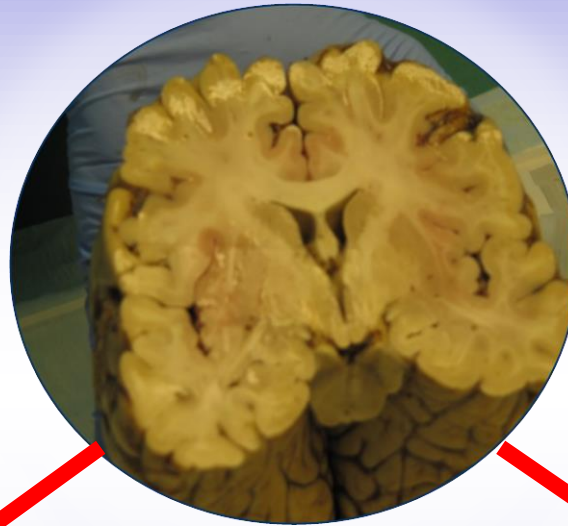
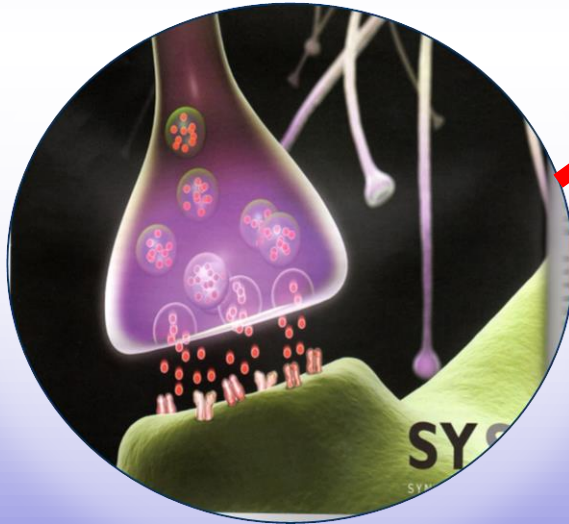


# NEVROBIOLOGI- NEUROSCIENCE

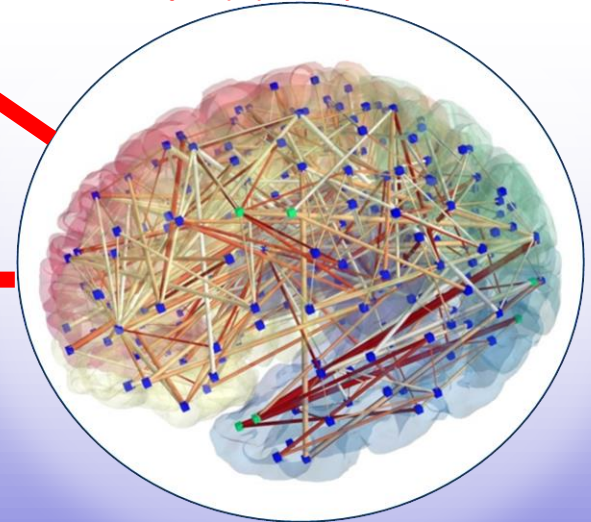
Anatomi

Nevroner, gliaceller og fibre

Biokjemi-synapser



Connectome  
nettverk

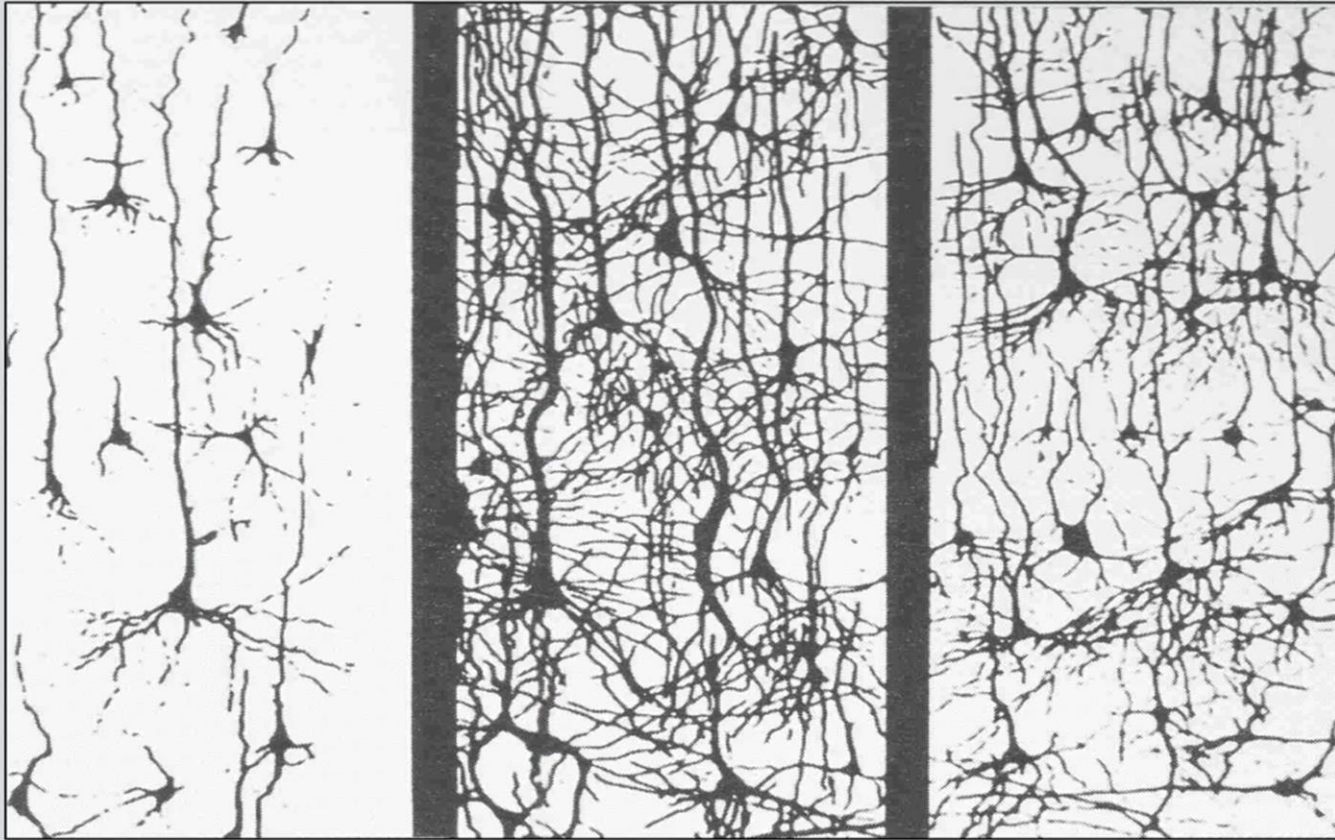


# Antall **synapser øker** dramatisk "LÆRING"

Fødsel

6 År

14 År

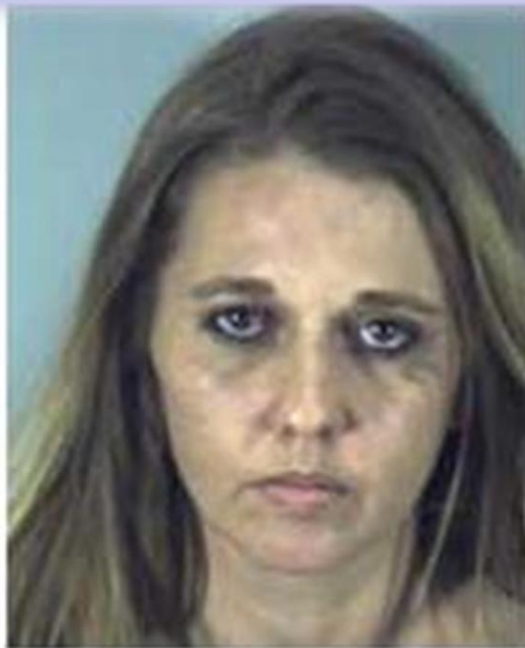




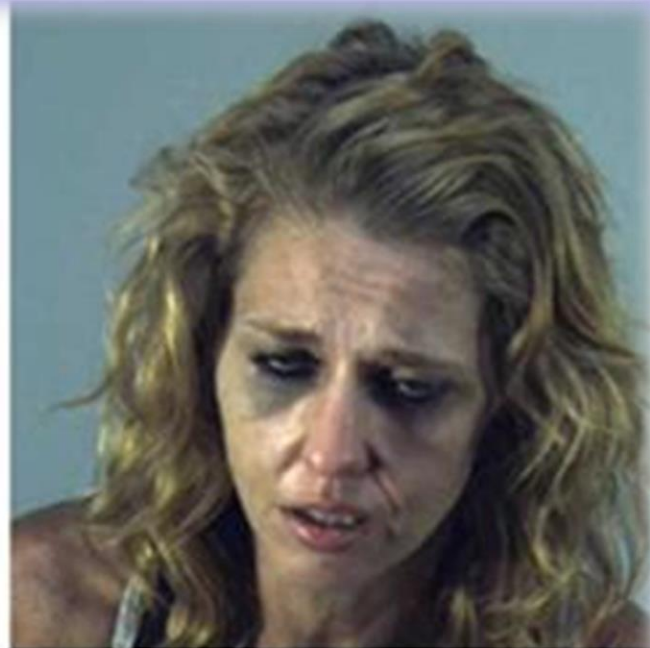
# DETTE ER OGSÅ LÆRING



**1** AGE: 32



**2** AGE: 37



**3** AGE: 38

We are the **Champions** my friends.  
And we`ll keep on fighting till the end.



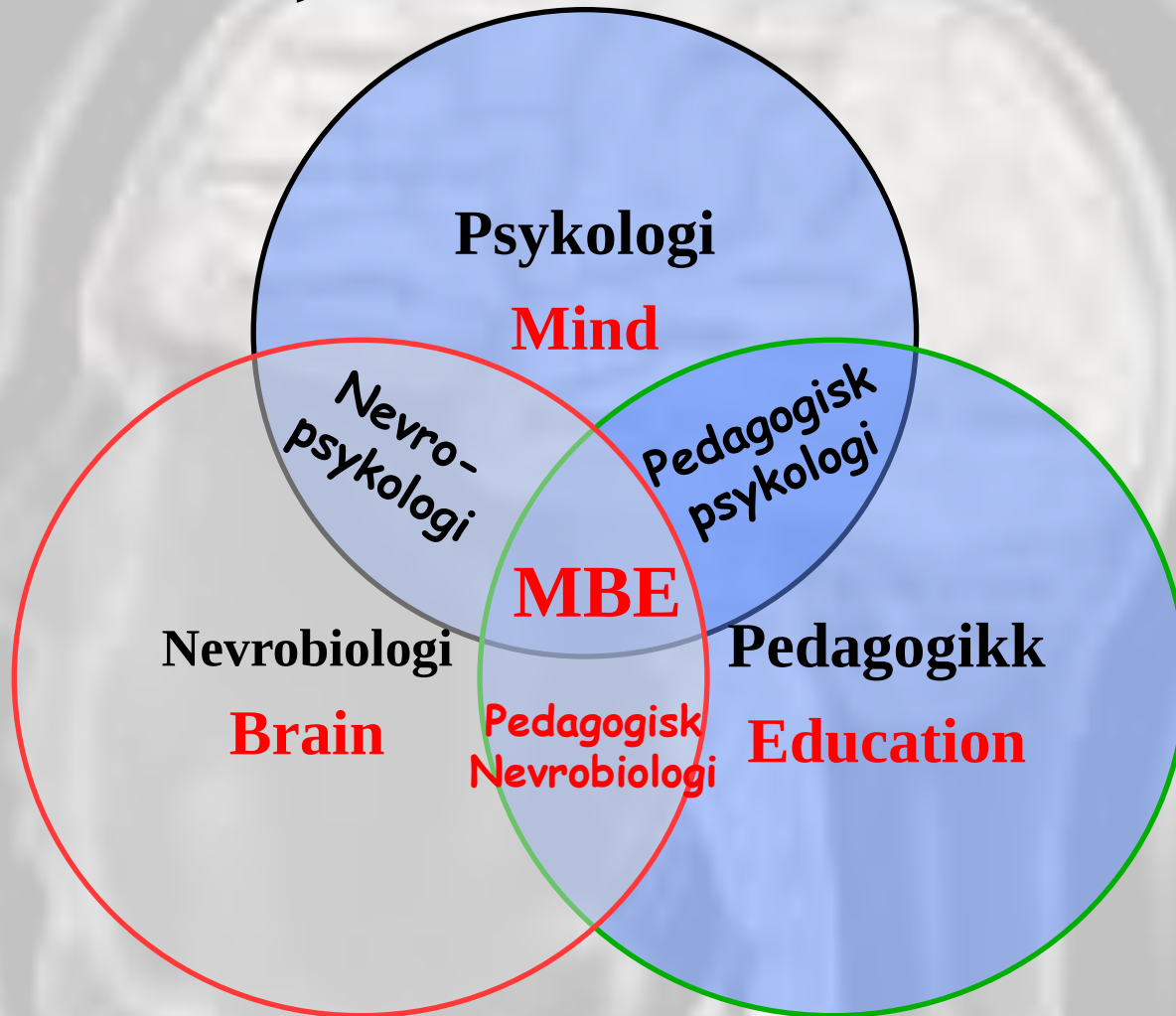
We are the **Neurons** my friends.  
And we`ll keep on fighting till the end.



DU må gjøre  
«Neurons til Champions»

ALLE  
kan bli Champions

# Mind, Brain and Education



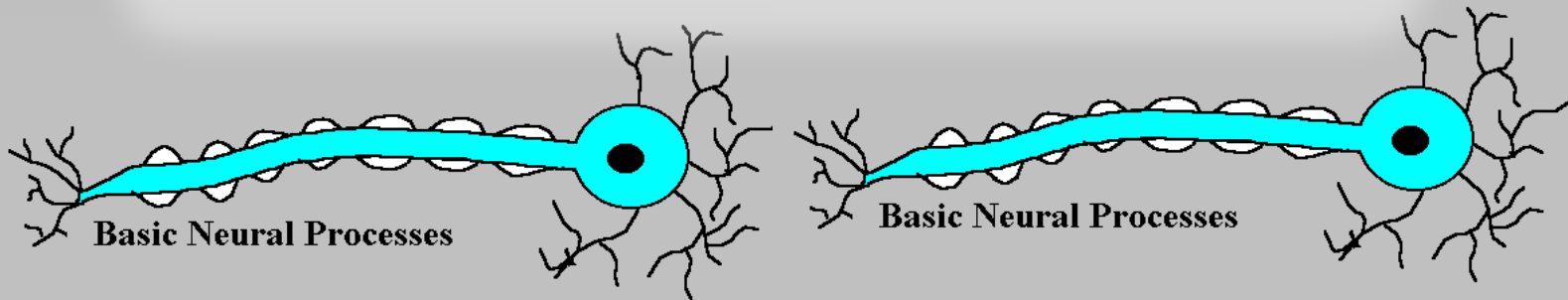


**Eric R Kandel:**  
Jeg vil vite hvilke endringer læring  
gjør i nevralt nettverk og hvordan  
minner lagres og opprettholdes ?



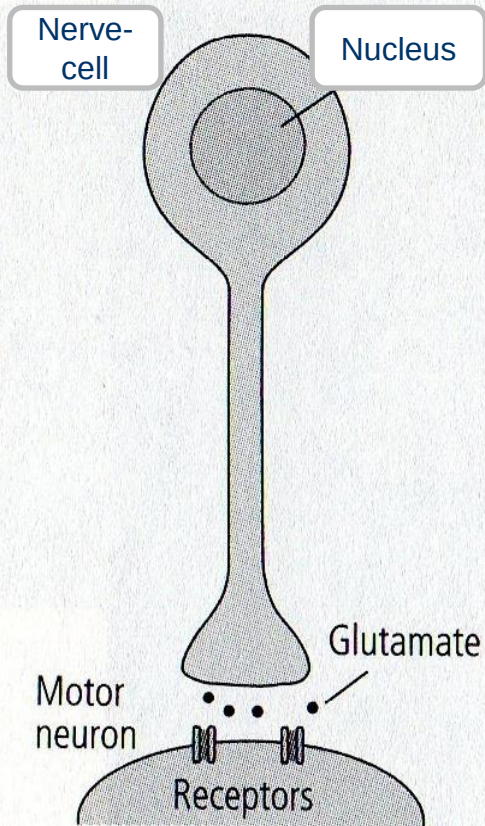
# "wiring by firing"

(Donald Hebb-1940)

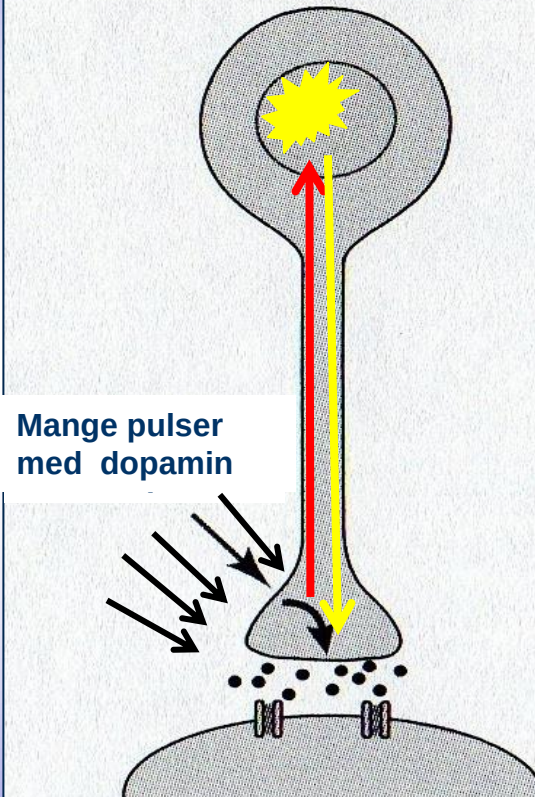


# Hva er læring? «Proteinsyntesen»

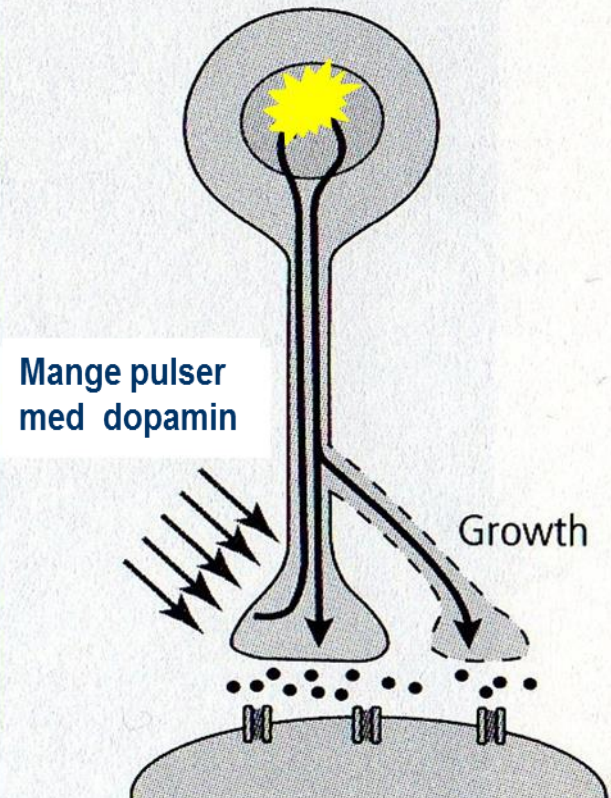
## Hvilesituasjon

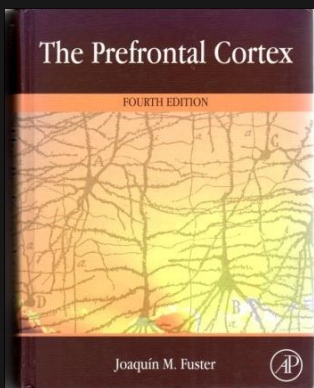


## Short-term memory



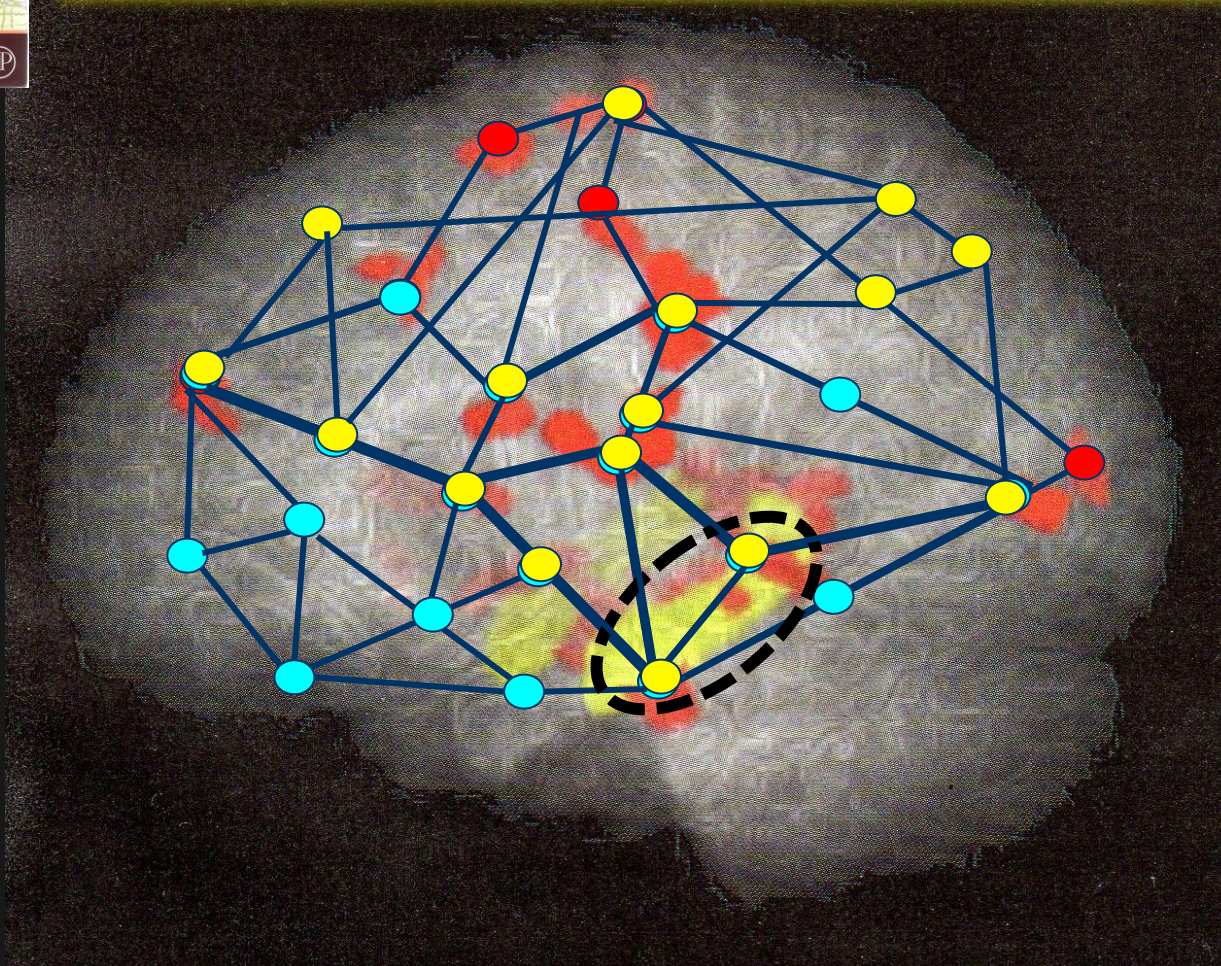
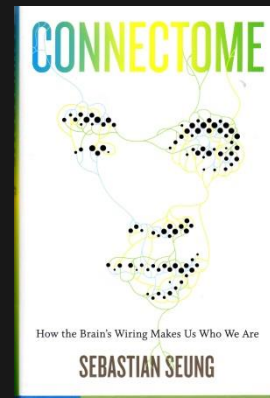
## Long-term memory



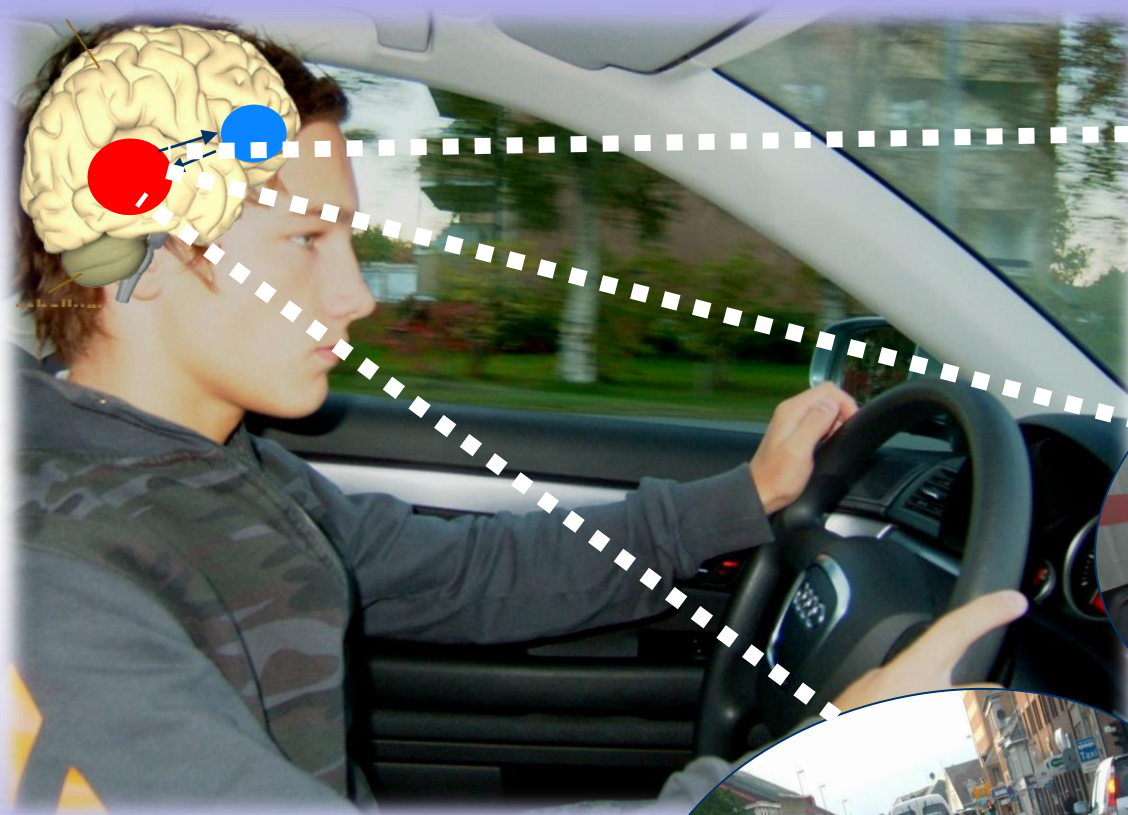


# Hukommelse - Nevrale nettverk

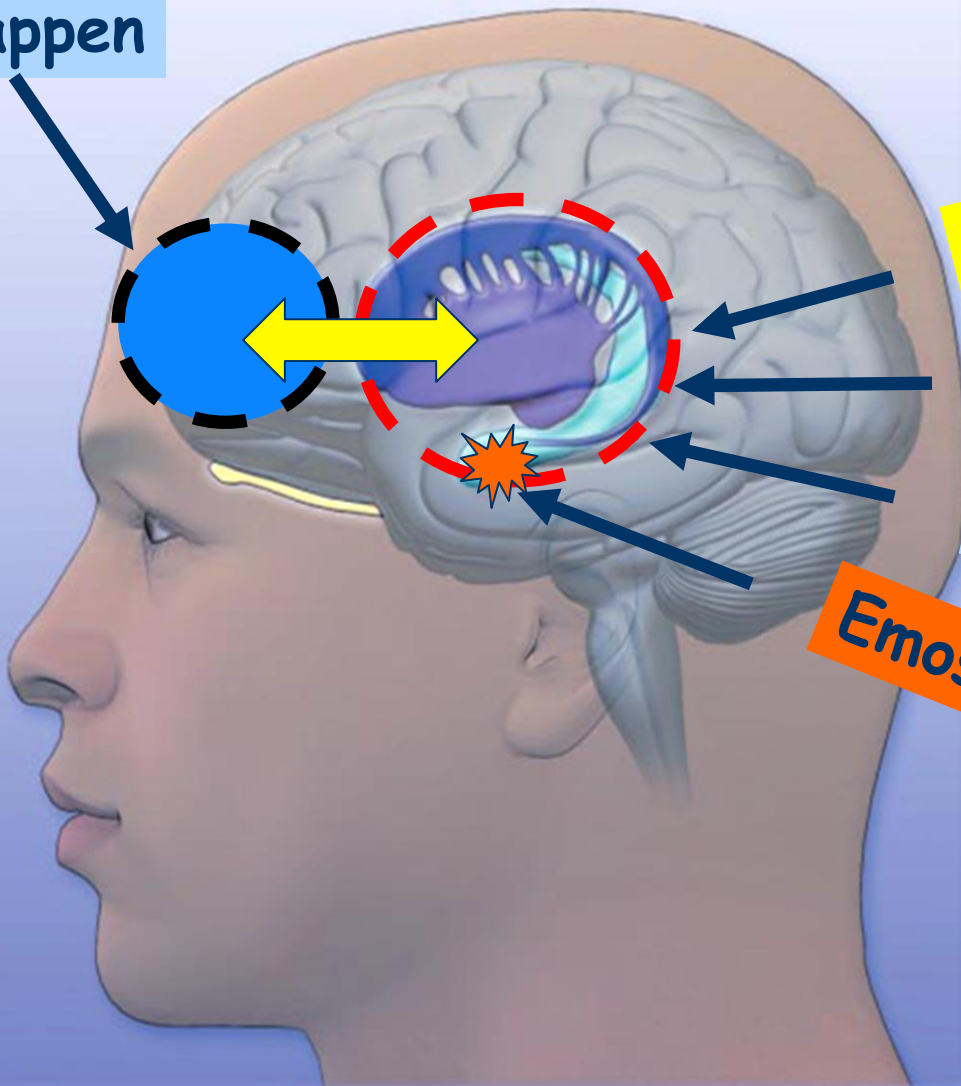
- mentale modeller «cognits» (J Fuster)
- Connectome (Spoorns-Seung)



Hvordan og hvor mye må du øve for å få  
en læringseffekt som blir  
permanent - langtidsminne?



Frontallappen



Læring

Hukommelse

Stedssans

Emosjoner



## Mind, Brain, and Education

The master's program in Mind, Brain, and Education is designed for students interested in connecting cognition, neuroscience, and educational practice, **especially involving learning, teaching, and cognitive and emotional development.**

# The Teaching Brain

## SiR2T

### Self in Relation to Teaching

What are you focusing your mind on throughout the process of teaching?

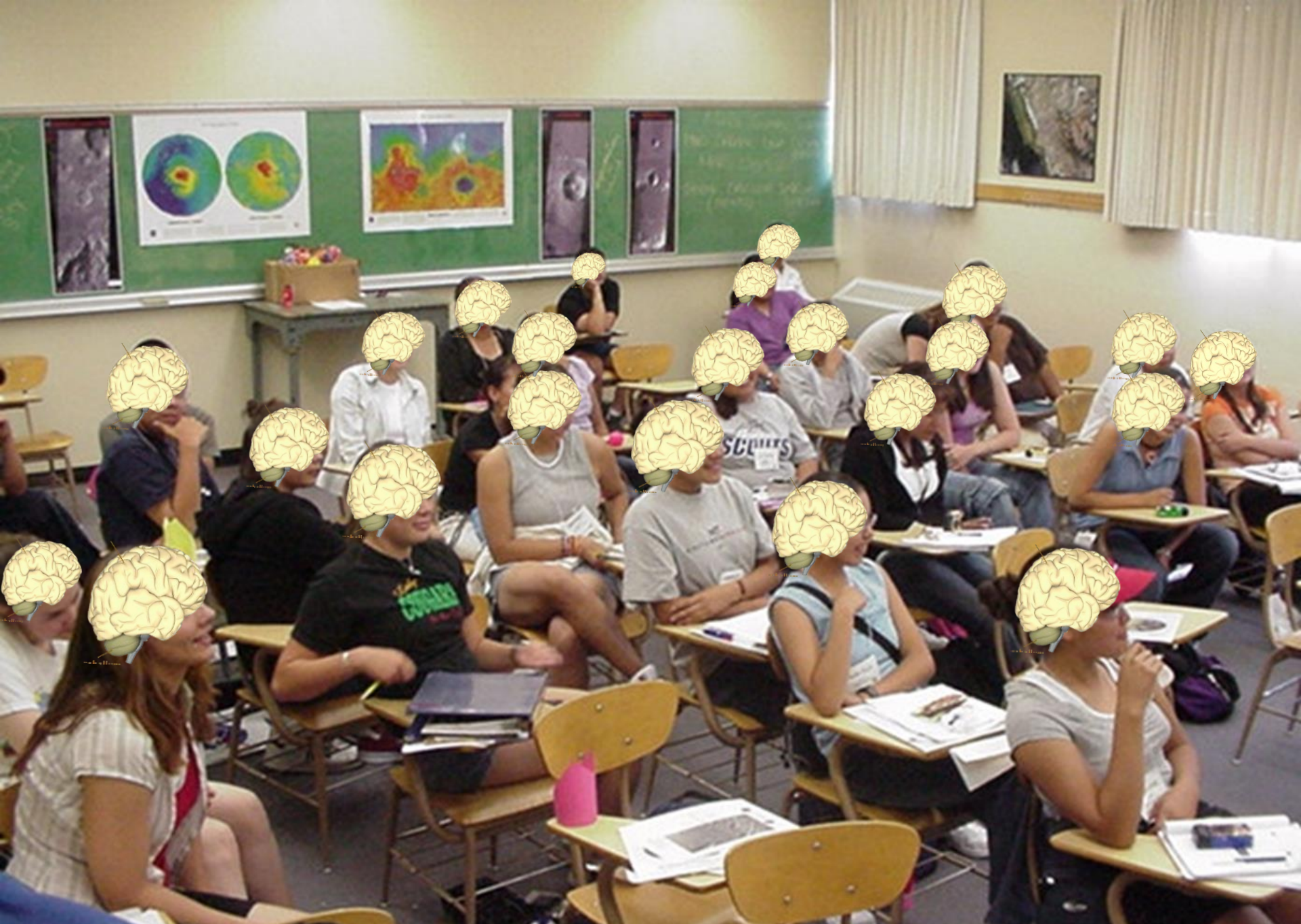
De plukket ut 23 «master teachers»

- Elevrelasjon, nærhet (connection-relationship)
- Samarbeid, gjøre ting sammen (collaboration)
- Gjensidig-felles nytte (mutual effects)
- Synergi-samhandling (synergy)

# Alex Stöckl - landslagstrener hopp



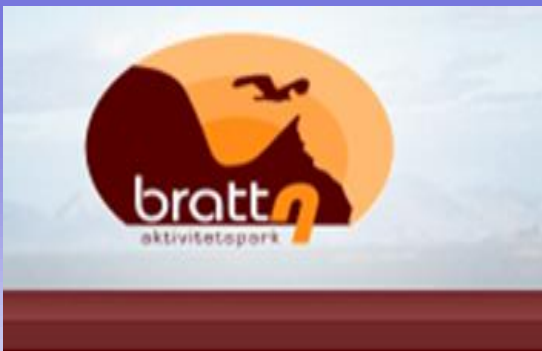
- Jeg er **ekstremt fokusert** når jeg følger en utøver på trening. Får ikke med meg noe annet.
- Jeg tror **positivt kroppsspråk** er en viktig del av kommunikasjonen mellom trener og utøver.
- Jeg tar **det innover meg** når noen skades. Jeg har grått, som da Tom Hilde og Anders Jacobsen falt og skadet seg stygt.





**Eksempler på  
prosjekter basert på tenkningen rundt  
Mind, Brain and Education**

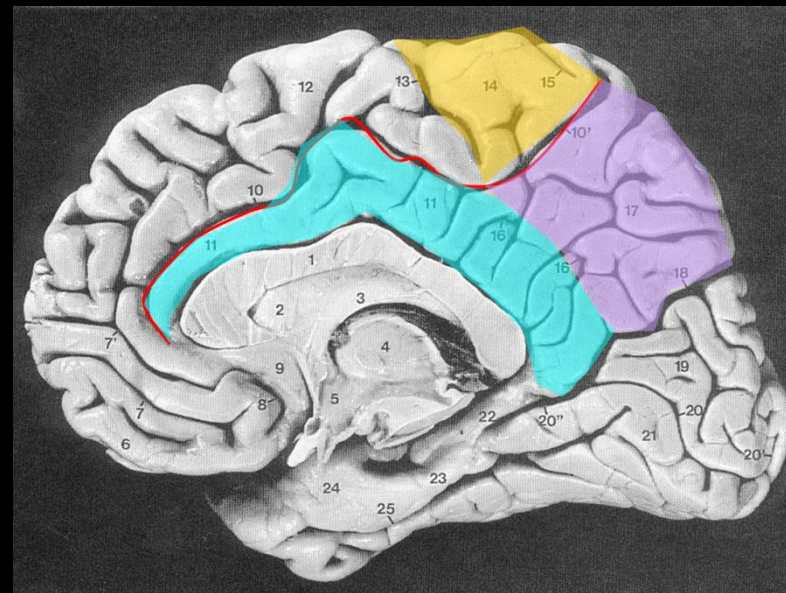
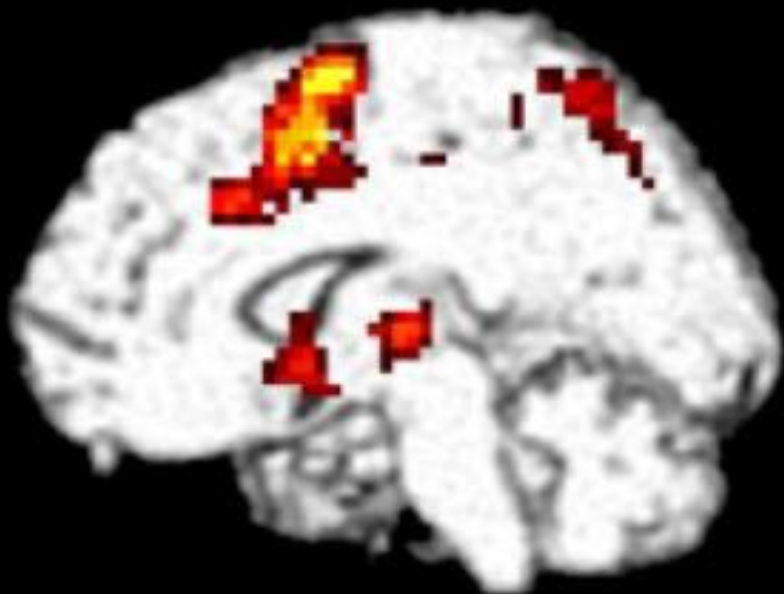




# NEURODRIVING

Statens vegvesen, TraFI,  
Univ.Turku CCN og SINTEF





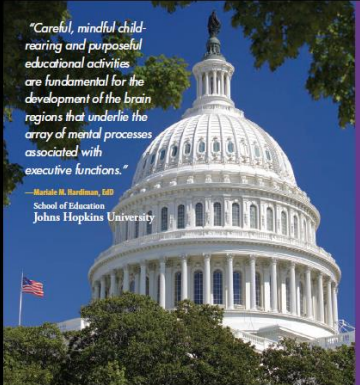
Beslutningstaking  
Emosjonell balansering  
Selvregulering  
Selvmonitorering

# International Mind Brain and Education Society (IMBES)

## Deltagelse fra HiNT og SINTEF

"Careful, mindful child-rearing and purposeful educational activities are fundamental for the development of the brain regions that underlie the array of mental processes associated with executive functions."

—Bridgette M. Wallis, PhD  
School of Education  
Johns Hopkins University



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- Meditation and Exercise on Learning
- ADHD and Executive Function
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- Ways to Treat Learning/Memory Deficits
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- Supporting Social-Emotional Growth
- Brain Training for Working Memory/IQ
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The principal art of the teacher is to awaken  
the joy in creation and knowledge

Albert Einstein 1879-1955