



Today's Schedule

Time	Topic
09:00 – 10:30	Part 1: Basics of neuro-didactics How do we learn? Part 2: Turning the Brain „ON“ The role of emotions for learning
10:30 – 10:45	Coffee break
10:45 – 12:30	Part 3: Constructing Language Actively Practical examples...
12:30 – 14:00	Lunch break
14:00 – 15:30	More practical examples how to apply the principles in class... Grammar... Vocabulary...
15:30 – 15:45	Coffee break
15:45 – 17:00	Applying the principles to your own classes

What do you know already?

Principles of brain-friendly learning

K	W	L
What I know about this topic:	What I want to find out.	What I have learned

Findings in the neuro-sciences corroborate the experiences and theories of good teachers.

Average Memory Retention Rates

- Lecture - 5%
- Reading - 10%
- Audio-Visual - 20%
- Demonstration - 30%
- Discussion Group - 50%
- Practice by Doing - 75%
- Teach Others
- Immediate Use of Learning - 90%

Today's topics

Part 1: Learning is a physical and chemical process.

Part 2: Turning the brain „ON“...

Part 3: Constructing language act...

Part 1: Learning is a physical-chemical process

“Teaching is the art of changing the brain. I mean, creating conditions that lead to change in a learner’s brain.”
James E. Zull, p.5

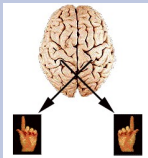
© MPI von Neurobiologie Meyer, in <http://www.nerv-medical.net/news/2011/01/22/791/Garnman.aspx>

The Brain

How does it work?

The human brain consists of:
about 100 billion neurons
About 100 trillion synapses

2 hemispheres connected by the Corpus Callosum

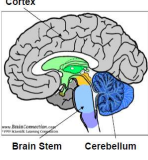


www.brainiacconnection.com
 ©2006 Academic Learning Corporation

<http://www.dlss.vermont.gov/dlss-politics/politics-04/politics-04-documents/04-trng-module-workbooks/training-module-3-brain-01>

The Brain

Parts



Brainstem (Reptilhirn)
 Coordinates unconscious processes: eyemovement, pupil width, breathing...

Cerebellum (Kleinhirn)
 Coordinates posture, muscle tension, balance coordination of movement, swallowing, reflexes...

Interbrain/Midbrain (Zwischenhirn)
 Thalamus, Hypothalamus, Pituitary gland (Hypophyse) ...
 Drives and instincts
 Blood pressure, hormones


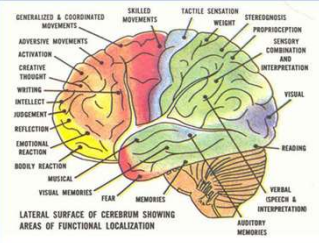
Limbic System: « emotion center »
 Amygdala, Hippocampus
 Joy, Addiction, Fear...

Cortex (Großhirnrinde)
 4 lobes control movement, perception and all higher order processes

<http://www.dlss.vermont.gov/dlss-politics/politics-04/politics-04-documents/04-trng-module-workbooks/training-module-3-brain-01>

The Cortex

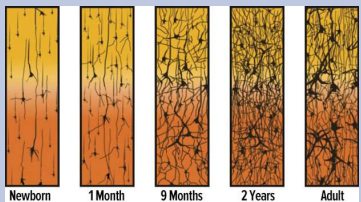
Frontal lobe
 Parietal lobe
 Temporal lobe
 Occipital lobe

LATERAL SURFACE OF CEREBRUM SHOWING AREAS OF FUNCTIONAL LOCALIZATION

<http://www.dlss.vermont.gov/dlss-politics/politics-04/politics-04-documents/04-trng-module-workbooks/training-module-3-brain-01>

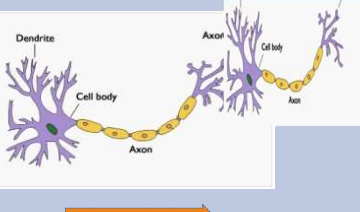
The development of synapse connections from baby to adult



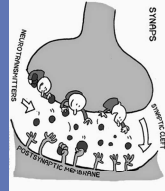
Newborn 1 Month 9 Months 2 Years Adult

<http://www.uhhealthlibrarians.org/sites/all/files/databooks/2011/01/03/synapse-density-over-time.jpg>

Signal transmission in neural networks



1 neuron can build up to 10 000 synaptic connections



Electrochemical signal transmission

Looking into the brain at work






What are the practical consequences?

A little experiment....


Neurons that fire together wire together



<http://www.ectontech.com/ecton/77023-the-first-real-time-non-invasive-imaging-of-neurons-forming-a-neural-network>

A little experiment...


- Think of a famous physicist...



<http://www.elf-lang.de/Ellien/Elstein.gif>

A little experiment...

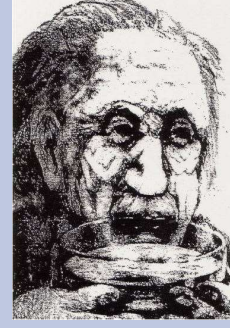
Venus Botticelli



http://b4.gglbt.com/g/ChaR4RiaAYoc3ZVOTZmPrlua5OjdlYfRcomphlLhTr449p_Te-u200

Ein kleines Experiment...

What do you see now?



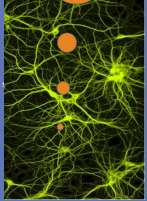
Neurons that fire together wire together

1. Principle

New information is linked to existing networks

Prior knowledge structures our perception.

General overview → details



<http://www.ectontech.com/ecton/77023-the-first-real-time-non-invasive-imaging-of-neurons-forming-a-neural-network>

“Neural networks are knowledge”

“Zull, p.92

Learning =

Growth of synapse connections

Myelination of axones

Applying new knowledge....

Why do we not remember wordlists as well as vocabulary learned in real life or in multi-sensory contexts?



2nd Principle

The brain stores different types of information in different ways and different places.

Types of Memory

- Ultra short-term
- Short-term
- Long-term
- Working memory
- Semantic and episodic memory
- Procedurales GD
- Deklaratives GD

<http://sehbilbarter-stampfabrik.at/CE3MECOTSSN/ModelldesGedachtnisses.html>

Regular and irregular verbs: Do you know the rules?

Können Sie die Regel für die Bildung des Partizip Perfekt im Deutschen?
Können Sie die Regel anwenden?

Procedural knowledge

Verben auf ---ieren bilden das Partizip Perfekt mit ---iert

- Ich « n... »
- Auch ge...
- Meine Na... am « pieruen » gerne. Letztes Wochenende haben sie den...
- Wir... Tag... Uhr...
- Ich « n... » gestern h... ich

Part 2: Turning the brain "on" ...

Body, mind and soul are interconnected

<http://www.mindlab.mcgill.ca/education/2015/10/2015-10-2015>

3rd Principle

Emotions are the key to the brain:

Emotions are the key to the brain

The limbic system decides whether information is let in.

- Emotionale und soziale Aspekte des Lernens spielen eine mindestens ebenso wichtige Rolle für das Schulgeschehen wie die intellektuell-kognitiven. (Bauer 2006)

HELP!

"I knew that perfectly well at home, but now I cannot think of the right answer..."

- The Amygdala (Mandelkern) recognizes the input as threatening.
- Sends an alarm signal to the Hypothalamus and the brain stem.
- Adrenalin and other mn neurotransmitter are produced
- Blood pressure and pulse frequency and muscle tonus rise
- Fight/flight reflexes are prepared – higher order thinking is turned off.
- This cycle can save lives (in the wild!!!) but does it help in exams?

<http://www.yourteacher.co.uk/depressionandillness.org/wp-content/uploads/2012/07/yourteacher-1.jpg>

AAA

FEAR !!!

Amygdala-Adrenalin-Anxiety

Produces a cognitive style that facilitates basic, automatic routines but prevents free associations and higher order thinking.

Alarm-system!

Fight flight reaction

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FIP
format
imagination
pride

Our stuff is cool enough to be published

...under the „dopamine shower“

www.gibsters.com

<http://www.ccslearning.com/ep-content/uploads/2012/10/21/010101-1010101.pdf>

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Spooky Stories

Topic 4

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FIP
Interactive Posters
With "glogster"

...more examples of cool formats

Humans are social animals

6th principle...
Learning is facilitated by social interaction

Mutual appreciation
Peer learning
Exchange of work on Moodle

Listen to your classmates' information and find all similarities, things that you have in common with each one.

Then write about the things you and your friends have in common.

Example: Cherry likes pizza. I also like pizza a lot.

Part 3: Constructing Language Actively

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How do we learn languages?

How do we acquire vocabulary?

- Do vocab-lists help?

How do we learn grammar?

- How useful are grammar books and grammar exercises in textbooks?

Efficient learning

Follows 5 stages:

1. Concrete observations and experiences
2. Awareness raising
3. Making hypotheses
4. Testing and refining these hypotheses
5. Proceduralization and performance

7th Principle

- Knowledge cannot be transferred from the teacher's brain into the learner's brain.
- Learners must actively construct meaning by making associations to prior knowledge.

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Who is working here
Who is learning?



Leise rieselt der Stoff...



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search: dl-000017

8th Principle:

Details stored in the hippocampus are extracted overnight and form PATTERNS

Extracting rules from examples



« Gehirne besitzen diese Fähigkeit zum spontanen Generieren von Regeln aufgrund von Beispielen « Alles was es hierzu braucht, sind die richtigen Beispiele, und zwar viele davon.

(Spitzer) (Spiller)

Do you recognize this?

Adjectives and Adverbs

How can we put the presented principles into practice?

How can we put the presented principles into practice?

... modifies verbs, adjectives, or other adverbs.

Examples:
He speaks **slowly**
She takes it very **seriously**
He is **especially** clever

Awareness Raising and Hypotheses building


Teachers' conference:

This is what your teachers said about your class:

Most students of 2b do their homework regularly.	Some students are a bit disorganized and forget to hand in their homework.
Most students do their work carefully.	Some kids hand in sloppy work.
Most kids work quietly in class.	A few kids are very noisy.
Most students work quickly and efficiently in class.	Many students are nervous during tests.
Some students work slowly but very carefully.	Some kids are impatient.
The class can sing beautifully.	The reading diaries are really beautiful.

Quick Check Grammar Chart

An alternative suggestion...



Sam Holmsson
Eric Nuttall
Claire West
Sam Holmsson
Chris Brown
Thelma Clark
cry bitterly
eat noisily
clap wildly
think carefully

Understanding grammatical concepts


The Past Tenses

- Background
- Circumstances
- Atmosphere

The sun was shining.
The birds were flying.
It was raining.
He was walking.

Best Event / Action

Suddenly the monster came.
It came towards me.
I ran away.
It jumped into the pond.



Slide 41

LP1

Lis Polzleitner, 07-Oct-15

Grammatical Concepts = Notions
Background and Circumstances

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Hypothesis making
Revising and clarifying new concepts

Refugees' experiences
(present perfect tense)

Multi-sensory input:

ISM Model von Ahsen
Images
Somatic Markers
Meaning

9th Principle: The brain can perform many processes simultaneously. Multi-sensory input facilitates learning

What is happening in this brain?

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<http://www.ooctiles.org/dmcrbridge/science/biology/images/brain3.jpg>

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It sounds right!

Irregular verbs raps...
...rather than staring at verb-tables.

What is happening in these brains?

Movement enhances learning

The Role of Movement

fMRI-study: Motor trace

VMI:
Manuela
Macedonia

Learning = simultaneous activation of neural networks

Macdonald, Marinka. "100 Hirnen und 1000er". In: Gehirn und Geist, Spektrum, 22.2.08.22.2012. <http://www.macdonald.at/online/1000er/100-hirnen-und-1000er/>

Movement – Speaking – Listening --Drawing

Conscious and unconscious learning

10th Principle: Learning is a conscious and an unconscious process

- Peripheral learning
- Conscious and focused learning
- Learning/Acquisition

A growing word

Aaaap-
Apfel
Der Apfel, die Äpfel
Ich mag Äpfel.
Ich beiße in den Apfel. Der Apfel hat Kerne.
Ein wurmiger, süßer, saurer, reifer, grüner, unreifer Apfel.
In den sauren Apfel beißen
...

Lee, R. (2011, 10 06). Flickr. Retrieved 11 06, 2011, from <http://flickr.com/photos/online.org/files/2011/10/Neuron-in-the-brain-illustration-by-Rebecca-Lee-on-Flickr.jpg>

Let's try it out

- to churn....
- to churn butter, a butter churn
- butter is produced by churning cream...
- the Chinese factory churned out cheap copies ...
- Hollywood is churning out sequels of the show...
- I am doing my best to churn out as many stories as I can...
- watching the poor guy made my guts churn...

To cut the long story short... Learning works best if...

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