

ACTIVE LEARNING THROUGH IMPROVED INTERACTIVITY

Lecture interactivity

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http://161.53.64.78/



Lecturer Audience

1304

Start

A

B

C

D

E

Send text

The Myths



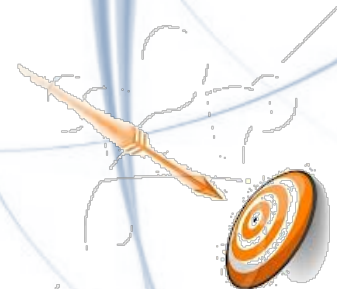
- 45 minutes
- copying from blackboard stimulates learning
- „do you understand?“
 - „do you have questions?“

How people learn?

Less is more



- first give them/explain the essence
 - essence/important/idea/cause & consequence
- details leave for later
 - much later



Memory



68,

Working Memory [WM]

- cognition, understanding, meaning
- conscious
- 7 ± 2 terms (to remember) [Miller 1956]
- ili 4 ± 1 terms (for use)

Long Term Memory [LTM]

- knowledge we use
- unconscious
- complete knowledge “base”
- “unlimited” capacity
- remembered for ever



Schemes

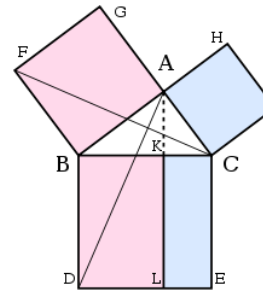


ett,

- car



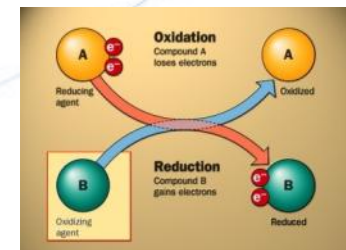
- Pythagoras' Theorem



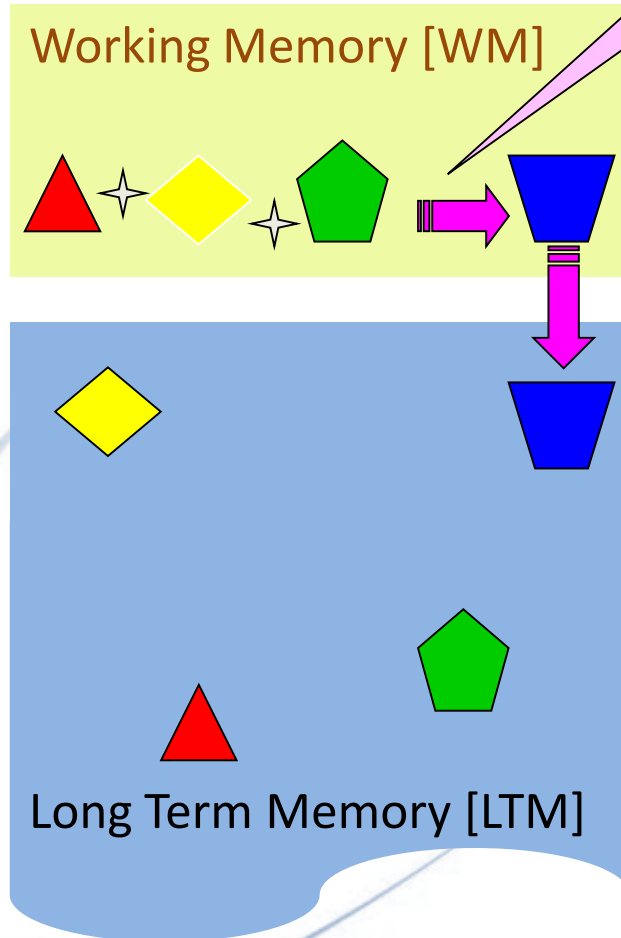
- democracy



- oxidation



Cognition and learning process



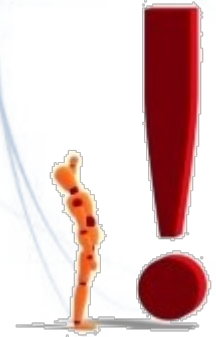
Aha !!!

- by connecting existing concepts
- new knowledge is created
- and stored in LTM
- if a concept is missing
- the attention is focused on it
- and there is no cognition

Why?!



- the student needs to understand
 - why **do I have to learn that?**
 - why **does it matter, at all?**
 - what is **the purpose of it at all, in MY life?**



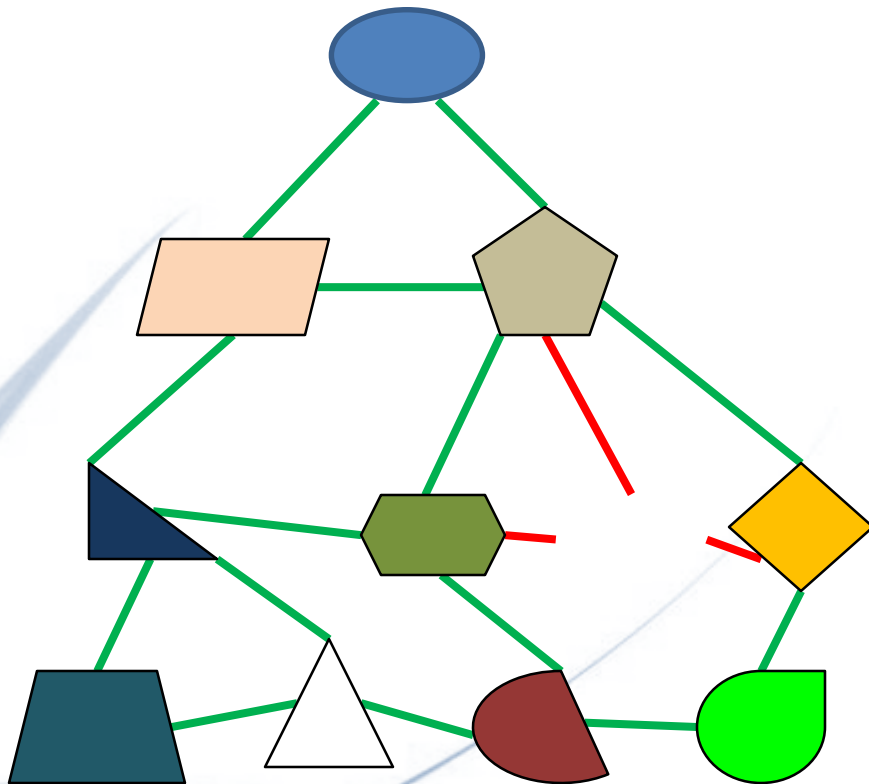
What does it have to do with me??!

What is human knowledge, actually?



[157]

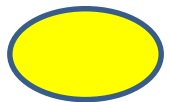
- knowledge consists of schemes
- hierarchical to some extent
 - from general terms
 - towards more specific ones
- connected in networks



- new schema
- needs to be connected, nested
- into the right place in the map



- unlinked schemas
- cannot be accessed, used
- and are forgotten



Listen more



- than you talk



- even if there is something you need to say
 - try to phrase it as a question



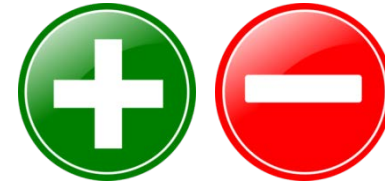
- if really YOU need to speak
 - use analogies
 - and examples, a lot of examples



Don't hand them the solution



- but rather ask question 
- guide students to define the problem
- let them think how would they solve it
- ask them what is good and bad
 - in their proposal



- guide students through the research and history of solutions
- let them feel the sweetness (and effort)
 - of discovering the solution



Don't (over-)load the mind!



- it is wrong to believe
 - that if we give students a lot of info,
 - if we give them a lot of info
 - at least **something** will remain, be remembered



- because, it WON'T!!!
 - quite opposite
 - **NOTHING** will remain.!!



Cognitive Load Theory



38

- Cognitive Load Theory (CLT)
- cognitive **load**
 - during learning
- should be **LOWER**
 - than student's cognitive **capacity**
- otherwise => **THERE IS NO** learning

$load \leq capacity$

Basics of CLT: Memory



In human mind everything happens in **working** and/or **long term** memory

Working Memory [WM]

Working Memory

- is where learning **occurs**
 - cognition, understanding, meaning
- happens consciously
- very limited capacity
 - 7 ± 2 concepts (to remember) [Miller 1956]
 - or 4 ± 1 concepts (to use)

Long Term Memory [LTM]

Long Term Memory

- is where **the knowledge is stored** which we use
 - unconsciously
- total “base” of knowledge
 - in the form of schemas and
 - automated procedures of recognition, retrieval and application of schemas
- “unlimited” capacity
- remembered for ever



Cognitive load

- during learning, the load on mind comes from =
 - intrinsic load (property of that knowledge) +
 - extraneous load (unnecessary) +
 - germane load (essential)
- this is load on **working memory**
 - and that load has to be lower than its capacity
 - otherwise **NO learning occurs**
- but the goal is **NOT** for the load to be **minimal**
 - because then also **NO learning occurs**, rather ...

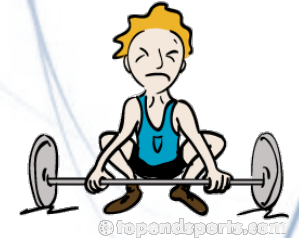


Intrinsic load



- Essential “weight” of teaching, depends on:
 - subject complexity
 - student’s previous knowledge and capabilities

$$\sigma^2 = \frac{\sum (x_i - \bar{x})^2}{n-1}$$

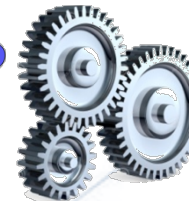
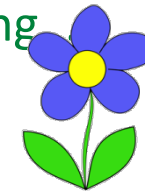
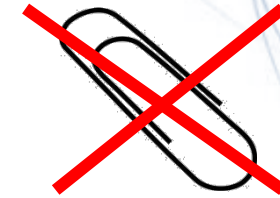
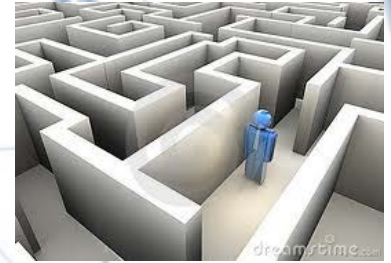


- How to reduce it:
 - **decompose** it to smaller parts, steps, phases
 - use **multiple channels**:
 - auditory and visual
 - tactile and kinesthetic
 - text and images



Extraneous load

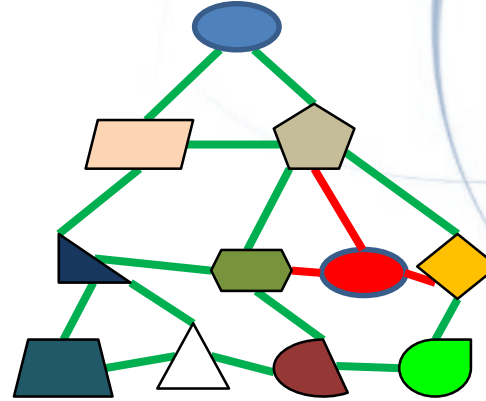
That is what the teacher does!



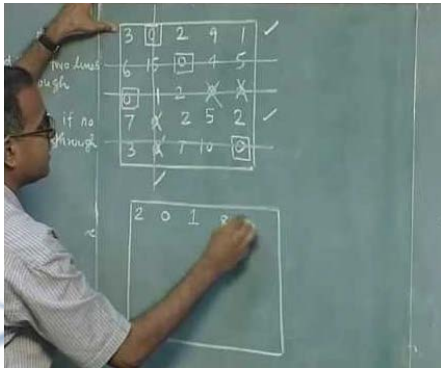
Germane, essential load



- creates **new** schemas
- and **automatizes** them



- it should be increased
 - **to the limit** of total student's capacity
 - exercises, assignments, discussions, practical work, ...



“AHA!” is not enough



- present them new
 - problems
 - questions ?
 - assignments



- so they can newly acquired knowledge
 - apply
 - put on test
 - discover its limits



And them ...

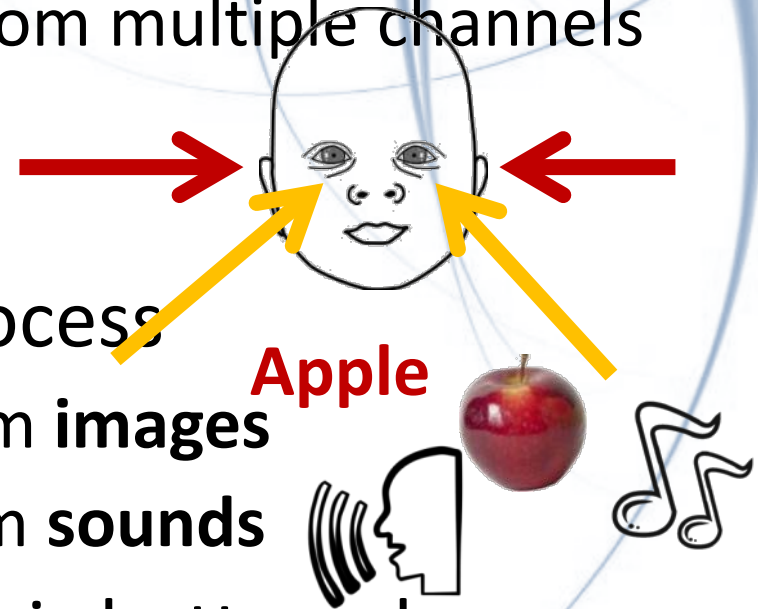
- encourage them to think
 - what does it all mean
 - where else can it be used
 - which problems can be caused
 - what if ...
- who else needs that knowledge
 - and why
- and, mandatory
 - what else they don't know?
 - what else they need to understand, learn



Cognitive theory of multimedia learning



- the brain can process information
 - simultaneously (in parallel) from multiple channels
 - auditory and visual
- and in each channel separately (sub channels) process
 - **written** words separately from **images**
 - **spoken** words separately from **sounds**
- understanding (and learning) is better when
 - **simultaneously** exciting, stimulating two or more (sub-)channels



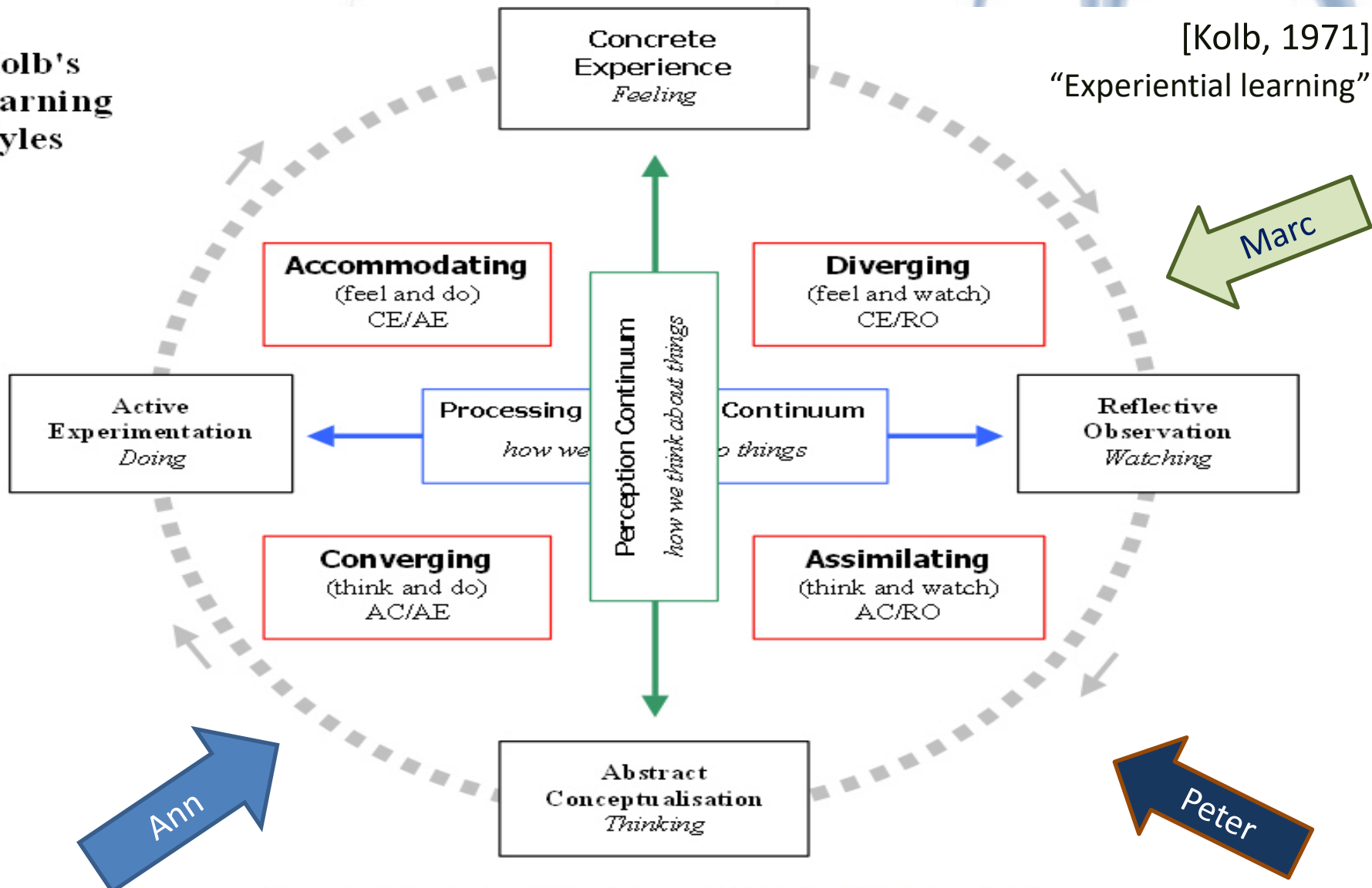
Apple

Individual learning styles



[Kolb, 1971]
“Experiential learning”

Kolb's
learning
styles



© concept david kolb, adaptation and design alan chapman 2005-06, based on Kolb's learning styles, 1984

Not to be sold or published. More free online training resources are at www.businessballs.com. Sole risk with user.

Individual learning styles



A lot of research, papers and classifications ...

Reading



-
-
-
-

Writing



-
-
-
-

Listening



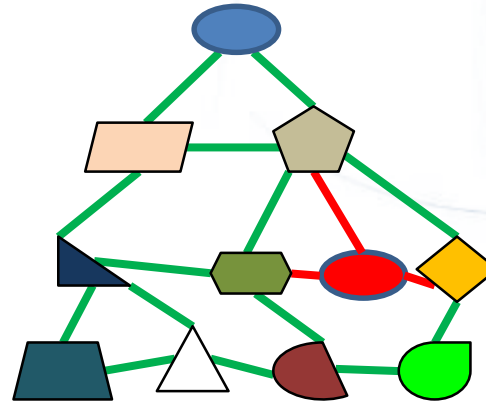
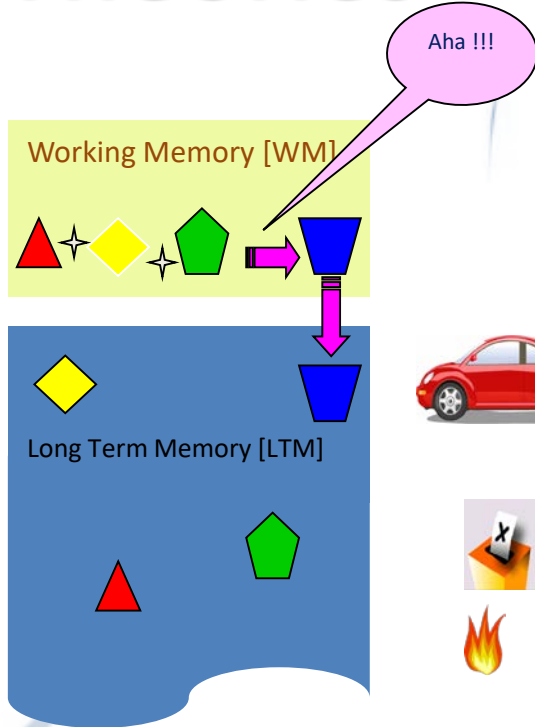
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Speaking



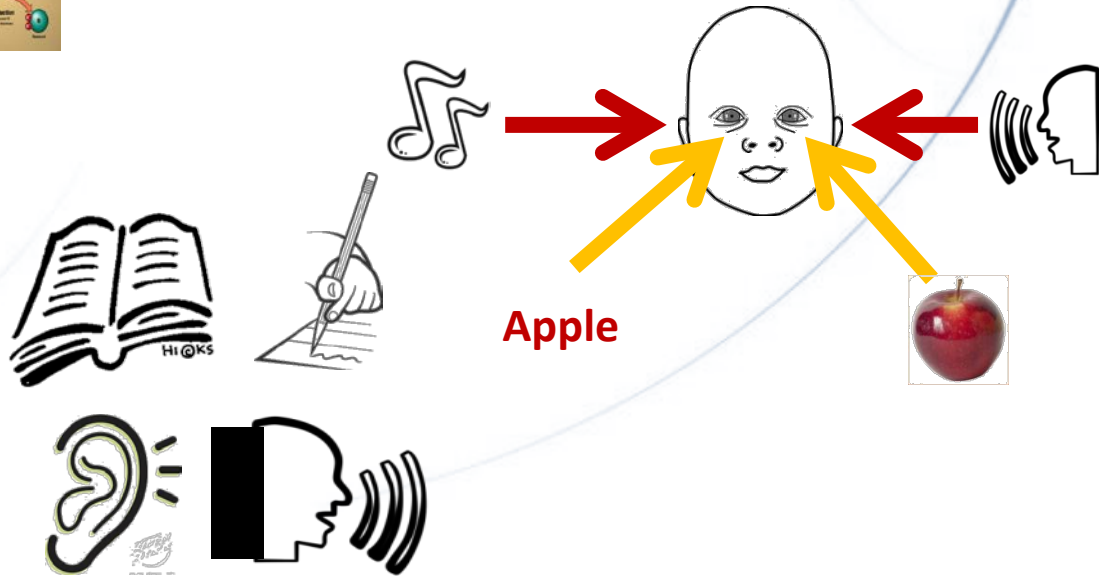
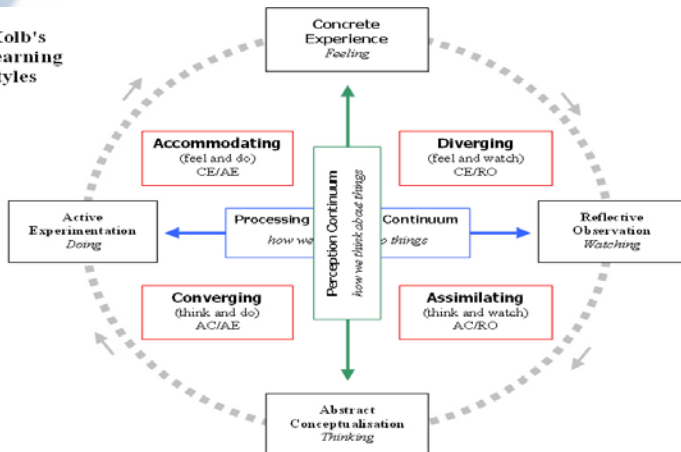
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Theories



load $\leq$ capacity

Kolb's learning styles



In short



- create a base for knowledge →
- less is more →
- ask question/problem/assignment →
 - instead of delivering solution
- they don't need information →
 - analogies, examples, illustrations ...
 - image, sound, movement ...
- new knowledge must be practiced →
 - assignments, questions, problems...
 - assignments, questions, problems...
 - assignments, questions, problems...
- let them think →
- make them wish →

Why do I learn this?



What is important??

Listen !



Tell the story !



Now !



What does that mean



What else I don't know



The Myths



- 45 minutes
- copying from blackboard stimulates learning
- „do you understand?“
 - „do you have questions?“

The Myth - 45 minutes



- studies show attention has to be **reinforced**
- every **10** to max **20 minutes**
- by students' activity
 - **answering** questions
 - or asking them
 - **solving** problems
 - **discussion** (in pairs or groups)
 - ...
- but **they** also **need** to receive **feedback**
- **from lecturer** on their effort

Every **10-15** minutes
give them some **task**
and feedback on their results

The Myth - copying from blackboard



- **copying** from blackboard
 - does **NOT** stimulate learning
 - NOR reinforces new knowledge
- rather it **DISTRACTS** from listening to lecturer

give them **handouts**
of your lectures, **beforehand**
so they can write **their thoughts**
next to your words

- **BUT writing down**
 - **OWN** thoughts, ideas, questions
 - or sketching new info **in another way**
 - table, mind map, drawing
- significantly **facilitates** learning

The Myth - asking questions



- there is **NO IMPACT** from asking
 - „do you understand?“
 - „do you have questions?“
- we need to give them **problems**
 - a specific question
- and offer them to make a **mistake**
 - **revealing** typical misunderstandings
- in order to **spot** cognitive **problems**
- and **correct** them properly

give them **quiz**
immediately after each
new concept and offer
typical **wrong answers**

Lecture interactivity means



- **active** learning
- **involving** students in interaction with
 - content,
 - other students,
 - teacher
- by **asking** questions
 - or **assigning** tasks
- involving **ALL** and **each** student



For interactivity we need



- appropriate **tools**
- enabling **each student** to answer/ask individually
- to get **fast overview** of their responses
 - in total
 - and individually
- **anonymously** and with names

We need
**Audience
Response
System**



But teachers need ...



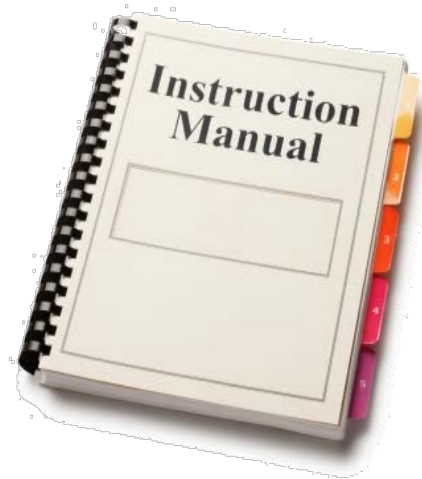
- **not only** a tool (ARS)
- but also **advice**
 - how to **change** their teaching practice to become **more interactive**
- and **support** in doing so
- and **good practice**
 - examples of methodology (pedagogy)
 - for various subjects or groups of subjects
 - languages, natural, social, humanistic, ...



Therefore, ALTII will produce



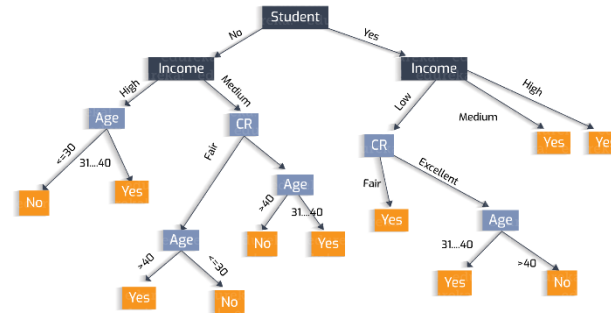
- not only an **ARS tool**
- but also **methodological examples**
- for all subject groups
- containing
 - lecture concept
 - discussions
 - exercises
 - questions
 - assignments



Each partner needs to produce



- several **examples**
- proposing
 - important **components** of increased lecture interactivity
 - lecture **structure**



In the next workshop we will jointly



- **analyze** proposed **examples**
- jointly **define** their future **structure**
- and **ways of presenting** them to future users



Structure



- theory
- method
- tools
- examples
- use cases
- issues
- support



- text
- video
- audio – podcast
- interview
- tools



Life Long Learning Akademija



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