Elementary, my dear Watson and other learning tricks

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221


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Science?

If you hear yourself say:

I *believe* that you can …	Study theology!
I *think* that this can …	Study philosophy!
From this *example*, we can *generalize* …	Study social science!
I have *decided* that water will …	Become a politician!
I have *heard* that …	Become a journalist!
Lars Bendix said …	See a shrink ;-)

If you consistently say "I know for sure" because:

- "I can prove" – you probably study math
- "I can measure" – you probably study engineering

…in both cases you use data/facts plus deduction/inference guided by theories to support your hypothesis and can call yourself **a scientist!**

Types of thinking

Watsonian:

- non-reflective thinking
- passive thinking
- “automatic” thinking
- effortless
- fast thinking

Holmesian:

- deliberate thinking
- active thinking
- reflective thinking
- dynamic thinking
- slow thinking

The 4 steps of Sherlock

1. background knowledge
2. observation
3. imagination
4. deduction

1. background knowledge:
   - sorting
   - relating
   - using

Background knowledge

For basic facts/data:

- Google/ChatGPT is too slow
- need to be “memorized”

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Sorting/relating:

- the cathedral in Pisa
- Denmark’s wars with Sweden

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Using – you remember:

- not what you *passively* see or hear
- but what you *actively* **do**:
  - write/say/discuss
  - underline/comment

2. observation:

- filters/bias
- focus
- maximize perceptiveness

Observation

Filter/bias:

- your brain receives 1 billion sensory data per second
- only 1% of those data are allowed to enter

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Focus:

- attention span?
- multi tasking?

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Focus:

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Maximize perceptiveness:

- oxygen
- physical activity
- beta-amyloid

3. imagination:

- set your fantasy free
- formulate multiple scenarios
- difficult – very difficult ;-)

Immagination

Brainstorming:

- spawn ideas
- no idea is bad
- be inspired by previous ideas

Immagination

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What do you need to get ideas?

- background knowledge
- broad culture
- “stupid/strange/weird” questions

4. deduction:
   - what is left is the solution
   - learn from your mistakes

Deduction

How do you “perform” deduction?

- discipline
- methodology
- theories

Deduction

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- methodology
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How do you learn from your “mistakes” (aka gaining experience)?

- *What* happened?
- *Why* did it happen?
- *How* can I avoid that it happens again?
- Go to start and repeat ;-)

Quiz

1. A bat and ball cost €1.10 in total. The bat costs €1.00 more than the ball. How much does the ball cost?

2. If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets?

3. In a lake there is a patch of lily pads. Every day the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take to cover half of the lake?

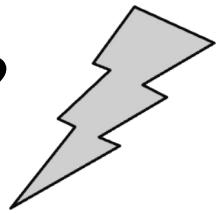
Answers

1. 10 pence
2. 100 minutes
3. 24 days

1. 5 pence
2. 5 minutes
3. 47 days

Conclusions?

- attention
- presence
- multi-tasking?



Menu

Now we could go further into:

- intelligence
- pattern thinking
- physical activity
- coffee
- paper
- deadlines
- breaks
- preparing
- focused work
- relaxing
- improving
- exam preparation

Intelligence

Intelligence is for the major part hereditary, but:

- for the part that is not, physical fitness influence 80%
- first-borns have an average IQ of 103,2

Menu

Pattern thinking

Chess players – beginners vs. grand masters:

- number of pieces recalled
- brain activity

Consequences for learning and exams?

Menu

Physical activity

A Danish study shows that there is a positive learning effect from walking, cycling or in other ways being physically active on the way to school. The positive effect lasts up to four hours after the activity.

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Coffee

Caffeine improves the efficiency of your long-term memory.
Taking 200 mg of caffeine (two cups of coffee) right after studying (eg. for an exam) improved the capacity to recall the studied information.

Menu

Paper

Many studies show that your understanding of something read from a screen is only from 30 to 60 percent as accurate as when read from paper.
One study showed that this also goes for fiction and when using a Kindle for reading.

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Deadlines

Leaving essays to the last minute can ruin your grades:

- marks dropped by as much as 5% as submissions got closer to deadline
- research urges universities to teach more time management to help students

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Breaks

Good breaks:

- meditation, reflection, short

Bad breaks:

- Facebook, mail, long

Menu

Preparing

Priming your brain:

- thieves vs. real-estate agents
- university students

Menu

Focused work

Problems with concentration?

- get enough sleep!
- get fit!
- use the Pomodoro technique!

The Pomodoro technique:

- decide on the task(s) to be done
- set the Pomodoro timer (typically 25 min)
- work concentrated on the task
- when the timer rings, take a short (5-10 min) break
- go to start, until four Pomodoros – or done
- take a longer (20-30 min) break

Menu

Relaxing

Mindfulness – focused attention:

- relaxing your mind
- focusing your attention

Relaxing your mind:

- the breath is the most popular anchor
- do breathing exercises – focus on your breathing
- let your thoughts/mind float
- stop your thoughts/mind from wandering
- focus on your breathing – air in – air out
- once your mind start wandering – go back to your breath
- when you cannot do that – you are done for today

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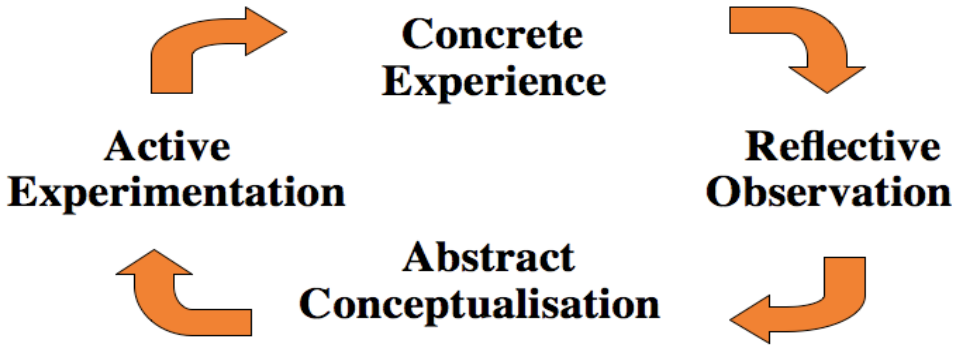
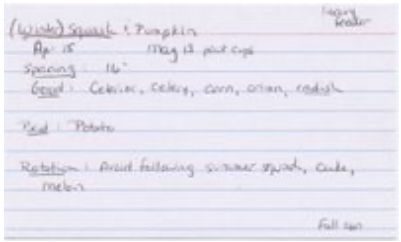
Improving

Kolb's learning cycle is the key to improvement:



Activity Post Mortem is:

(5 min.) +



- do APM ***immediately*** after an activity
- schedule the ***processing*** of data

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Preparing for exam

How to increase your concentration:

- stop multitasking
- plan your time
- get good routines
- what distracts you?
- optimist or pessimist for time
- take breaks

- plan 3-4 very intense hours per day

Menu