

Learning with support of digital tools

6th National Meet&Greet of Swiss Medical Librarians



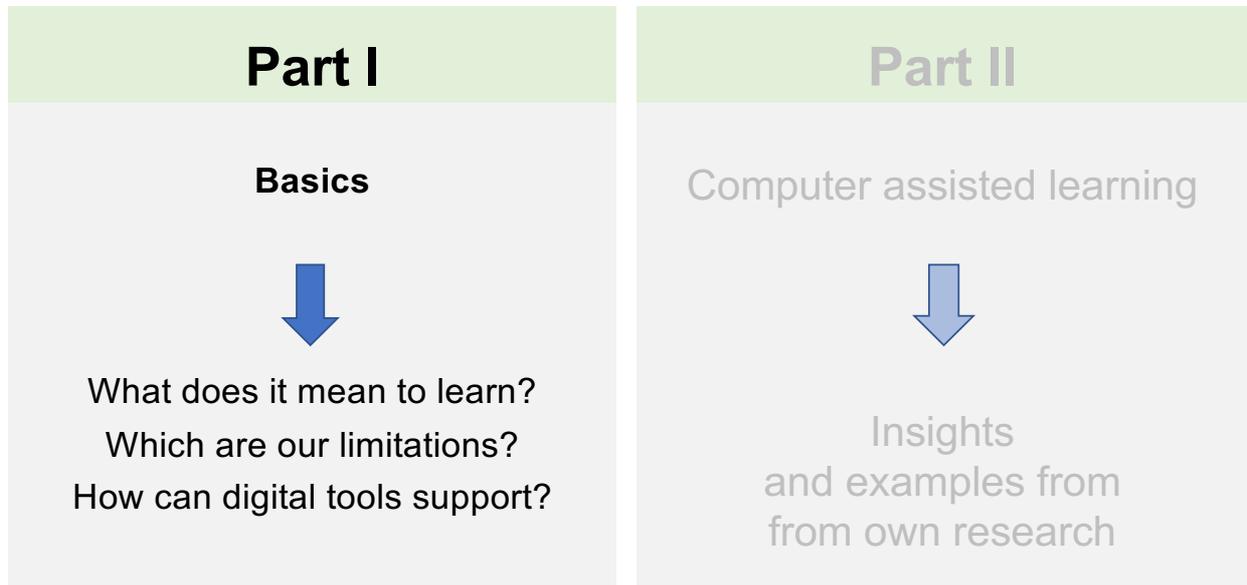
Learning digitally – ingenious or disastrous?

Sissel Guttormsen, 27.08.2018

Is the digital transformation, a surprise?

- National research programme (NFP), call 2017
"Herausforderungen der Digitalisierung für Bildung und Forschung in der Schweiz - Aktionsplan Digitalisierung"
- Forum für Universität und Gesellschaft, November 2017
DIGITALE WELT - Analoge Erfahrung
- June 2018, decision to introduce the Federal Licencing MCQ Exams, for human medicine on Tablet computers in 2021.
- Careum Dialog, January 2019 :
„Digitale Transformation in der Bildung der Gesundheitsberufe“.
- ...

Overview



1) What does it mean „to learn“?



**A good advice can not be followed
if it is not understood.**
(Ladislaus Kuthy)



**Tell me and I forget.
Show me and I remember.
Involve me
and I understand.**
(Confusius)

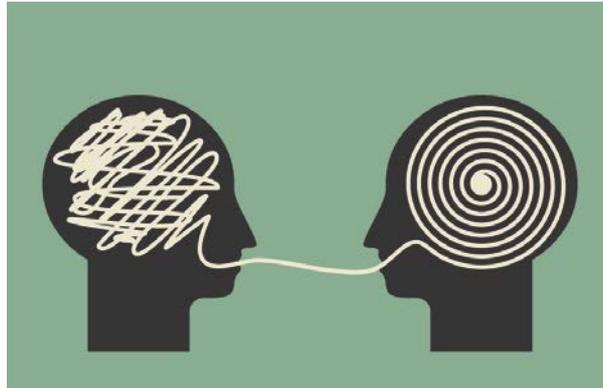
**Excellence is never an accident.
It is always the result of high
intention, sincere effort, and
intelligent execution...**
(Aristoteles)

**Forgoing thinking
is intellectual bankruptcy**
(Albert Schweitzer)

Learning theories offer different perspectives on learning

- Learning is a **personal active process** of constructing new insights by integrating new knowledge elements in already existing knowledge. (*Cognitive theories / Constructivism*)
- New **knowledge** and **behavior** can be acquired **by observing and imitating** others in a social context. (*Social Learning Theory, Bandura*)
- **New skills** can only be acquired **through rewards and punishments of behaviour.** (*Behaviourism / Operant Conditioning*)
- We learn **meaning of** concepts or constructs through **interaction with others** in a **social context**, and through interpretations of that world by actively constructing **meaning.** (*Social Constructivism*)

2) Which are our limitations?



Informationprocessing: *limited capacity*

- Support **attention** and **concentration**
→ Learning ist to undertand, this needs (*too*) much cognitive resources

- Pay attention to the **amount of Information**
→ Too much information at once overloads the working memory.

- Make **meaningfull information chunks**

7 ± 2



→ Sweller, J., Ayres, P., Kalyuga, S. (2011) *COGNITIVE LOAD THEORY*, Springer, New York, 2011, 274 pp., ISBN: 978-1-4419-8125-7

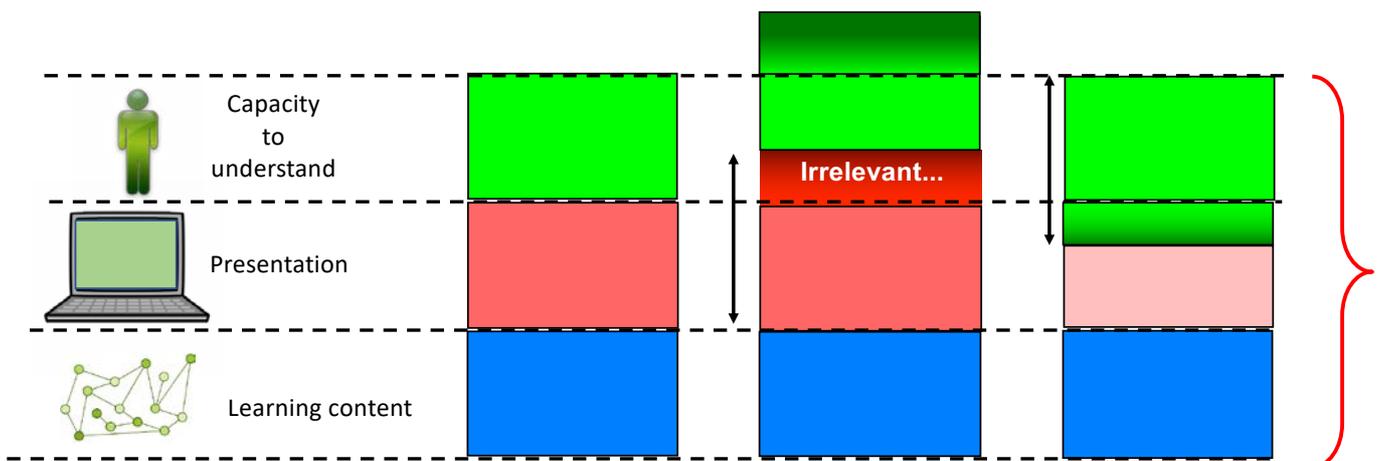
→ Mayer, R. (2009) *Multimedia learning*, 2nd Edition, Cambridge, Cambridge University Press.

→ Miller, G. A. (1956). "The magical number seven, plus or minus two: Some limits on our capacity for processing information". *Psychological Review*. **63** (2): 81–97. doi:10.1

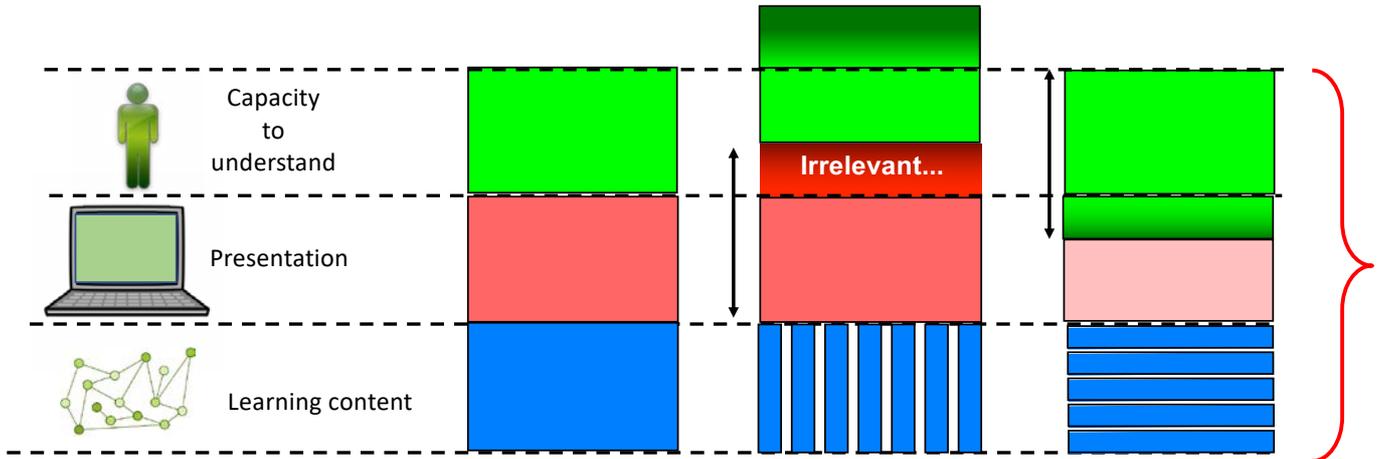
3) How can digital tools support learning?



Reduce the cognitive load: *Simplify presentations*



Reduce the cognitive load: *Structure the learning content*



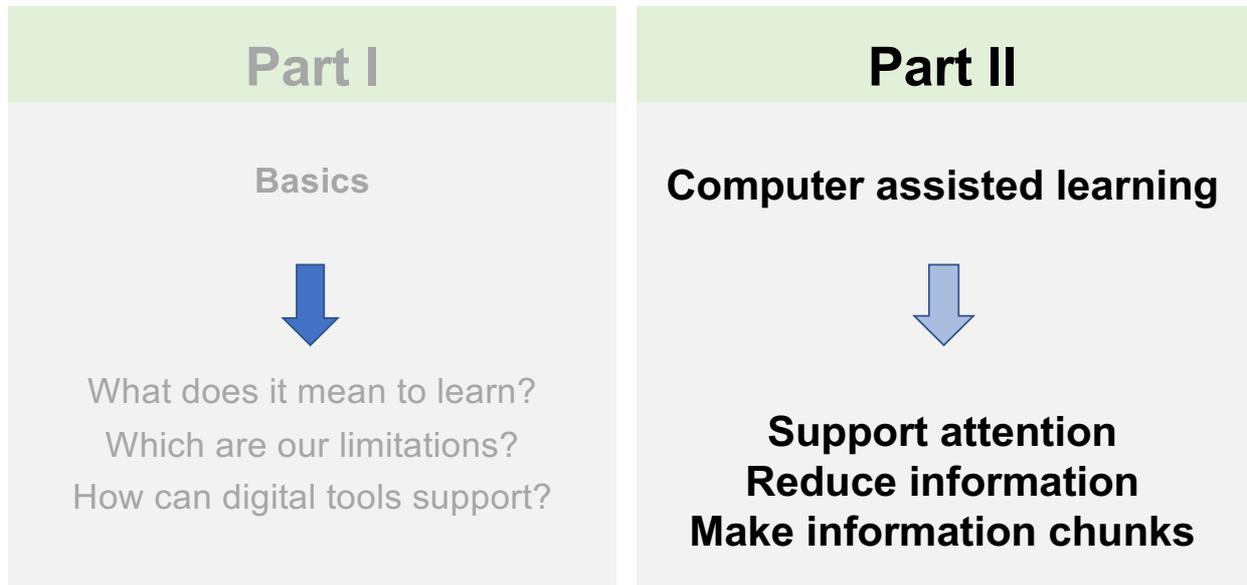
Make Chunks:

*Afugrnud enier Stidue an der elingshcn Cmabrdige Unvirestiät ist es eagl,
in wleher Rienhelfoge die Bcuhtsbaen in eniem Wrot sethen,
das einzig wcihitge dbaei ist,
dsas der estre und lzete Bcuhtsbae am rcihgiten Paltz snid.*

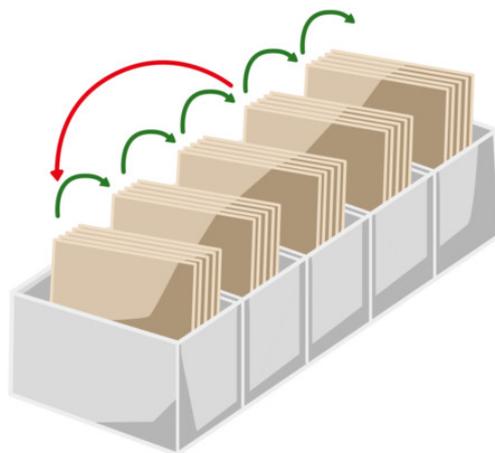
*Der Rset knan ttolaer Bölsdinn sien und man knan
es torztedm onhe Porbelme lseen.*

*Das ghet dseahlb, wiel das mneschliche Geihrn
niciht jdeen Bchustbaen liset sodnern das Wrot als Gnaezs.*

Overview



How important is the learning strategy?



Which strategies are successful?
...which factors are determinating?



Rational



Well-defined task
Goal and Rules **known**.



Exploration

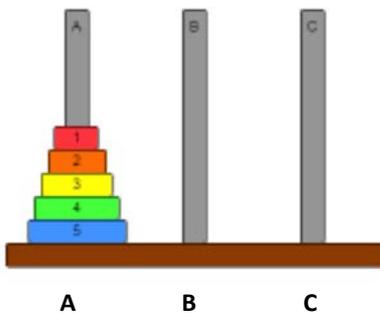


Ill-defined task
Goal and Rules **not known**.

Guttormsen Schär, S. (1996). The influence of the user interface on solving well- and ill-defined problems. *International Journal of Human Computer Studies* 44, 1, 1-18

Task:

Learn the rules of the ,*Tower of Hanoi*'



The *interaction method* influenced the learning strategy



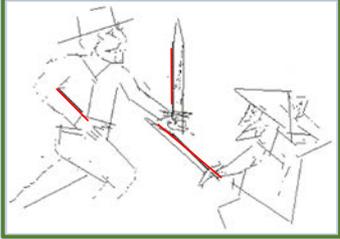
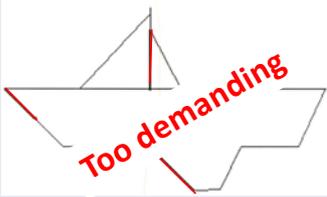
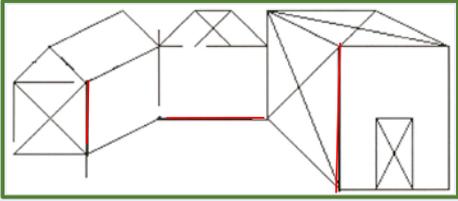
... the thinking stopped as soon as the participants had a computer-mouse in the hand
 → A rational learning strategy is a benefit for rule-based tasks

Which strategy is successful for creative tasks?

<i>Creative task</i>	Draw something of <u>your own choice</u> , name it	Draw a <u>house</u>	
	original complex aesthetic	original complex aesthetic	Exploring
	original complex aesthetic	original complex aesthetic	Rational
	Criteria	Criteria	

?

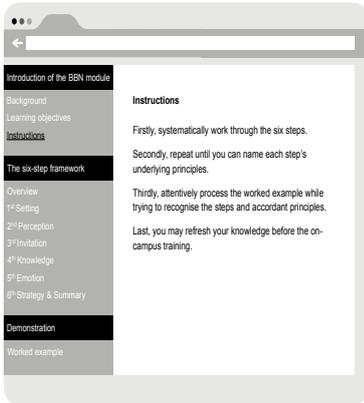
The *interaction method* influenced the result

	Open Task	Closed task
Mouse		
Keyboard		

Can complex social skills
be acquired from computer learning?



Communication training *for health professionals*



Transfer to praxis

1 Learning theory
Understood ?

2 Video:
Observe role model
Combine theory with example?

3 Practice
communication skill
Correct implemented?

Which didactical means sind effective?

Einleitung
- 6-Schritte Protokoll
6-Schritte Protokoll
1 Vorbereitung
2 Patientenwissen einholen
3 Wieviel Erfahren?
4 Information geben
5 Emotionen
6 Follow-up

Theory / Basic information



Eroneous vs. correct examples

Prompts for reflection:
Correct or wrong?

Feedback:
Explanation

Connect theory + example

Stimulate thinking / reflection...

Learning with erroneous examples had positive impact on practical skills

Schmitz, F. M., Schnabel, K., Stricker, D., Fischer, M. R., & Guttormsen, S. (2017). Learning communication from erroneous video-based examples: A double blind randomised controlled trial. *PEC, Patient Education and Counseling*. <http://dx.doi.org/10.1016/j.pec.2017.01.016>

Exploring use of videos for Learning...



F.M. Schmitz*, K. Schnabel* (*authors contributed equally), D. Bauer, C. Bachmann, U. Woermann, **S. Guttormsen**, The learning effects of different presentations of worked examples on medical students' breaking-bad-news skills: A randomized and blinded field trial, *Patient Educ Couns* (2018), <https://doi.org/10.1016/j.pec.2018.02.013>

Which presentation form is better?

doctor

What do you already know and what are your expectations?

patient

I have undergone some examinations and there was this lung reflection, for which a tissue sample was taken from me.

...

For this I have not yet received any findings or any information.

doctor

Do you want me to tell you the detailed test results or only the conclusion for now?

← **Reading dialogue**
(Sufficient?)

See and hear
(Attention?) →

Annotated dialogue
(too much/ , overload'?) ↓

patient

I have undergone some ...

doctor

What do you already know and what are your expectations?

Setting The doctor greets the patient and asks how about the current workup. The then discusses the appropriate procedure with the patient.
Perception Here, the physician clarifies the patient's perception by using open-ended questions.
Invitation The doctor asks the patient to what extent he wants to be informed. The patient needs to make a decision on how much information he wants to receive.
Knowledge The doctor addresses the bad news with a "warning shot" before he communicates it in simple, understandable words.
Emotion The doctor is waiting that the patient addresses his affective response and confirms his legitimacy.

What do you already know and what are your expectations?

I have undergone some ...

Stimulate reflections



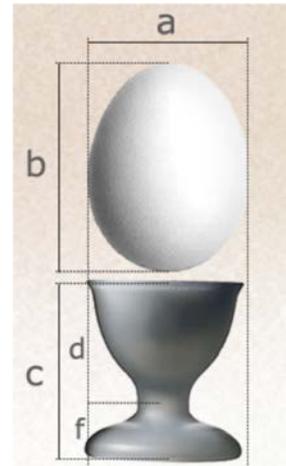
Learning digitally – ingenious or disastrous?



“The big picture”: Digital transformation in education

- Cognitive ergonomics + classical *usability*
- User-centred vs. Technology driven
- Learning design is an interdisciplinary task
- Technology without didactics is lost endeavour

Rather simple and ingenious than complex and disastrous



Technical innovation + meaningful implementation

- De-accelerate learning with new media ...
- Constructive alignment of learning objective and presentation...
- Enable knowledge building in small steps...
- Details are important!
- ... Also a theoretical foundation.

Learning with support of digital tools is exiting.



Thank you for your attention!