



Forget the formula, reflect your results!

How to learn complex correlations with mobile apps

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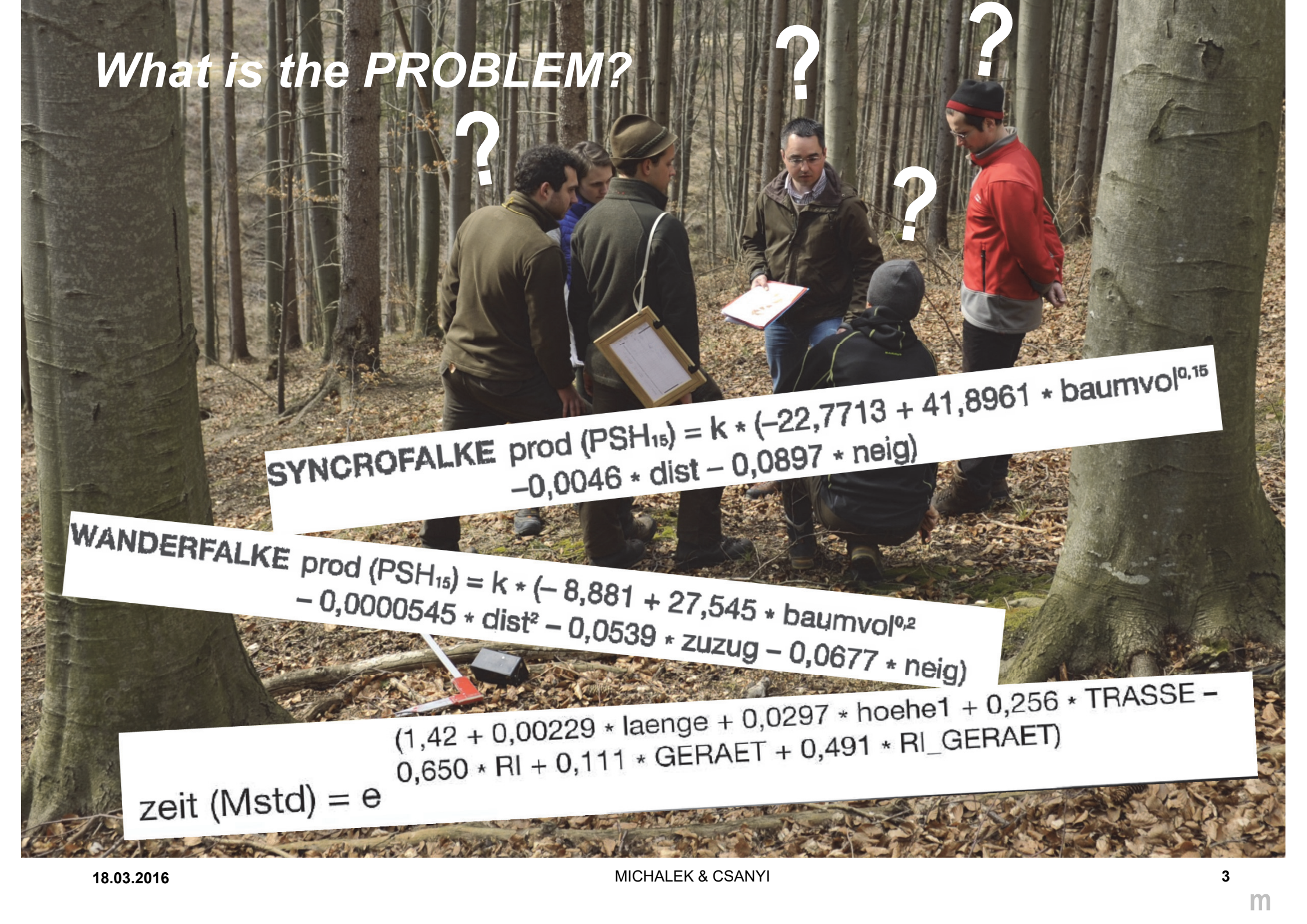
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What to expect

- What is the PROBLEM?
- Which THEORY can we APPLY?
- Which USE CASES can we cover?
- Which TOOLS can we use?
- What are our EXPERIENCES and NEXT STEPS?



What is the **PROBLEM?**

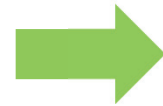


SYNCROFALKE prod (PSH_{15}) = $k * (-22,7713 + 41,8961 * \text{baumvol}^{0,15} - 0,0046 * \text{dist} - 0,0897 * \text{neig})$

WANDERFALKE prod (PSH_{15}) = $k * (-8,881 + 27,545 * \text{baumvol}^{0,2} - 0,0000545 * \text{dist}^2 - 0,0539 * \text{zuzug} - 0,0677 * \text{neig})$

zeit (Mstd) = e $(1,42 + 0,00229 * \text{laenge} + 0,0297 * \text{hoehe1} + 0,256 * \text{TRASSE} - 0,650 * \text{RI} + 0,111 * \text{GERAET} + 0,491 * \text{RI_GERAET})$

Intended learning outcomes?



$$\text{SYNCROFALKE prod (PSH}_{10}) = k * (-22,7713 + 41,8961 * \text{baumvol}^{0,16} - 0,0046 * \text{dist} - 0,0897 * \text{neig})$$



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*Which THEORY can we **APPLY**?*



Four hypotheses stimulate our reflections.

meaning

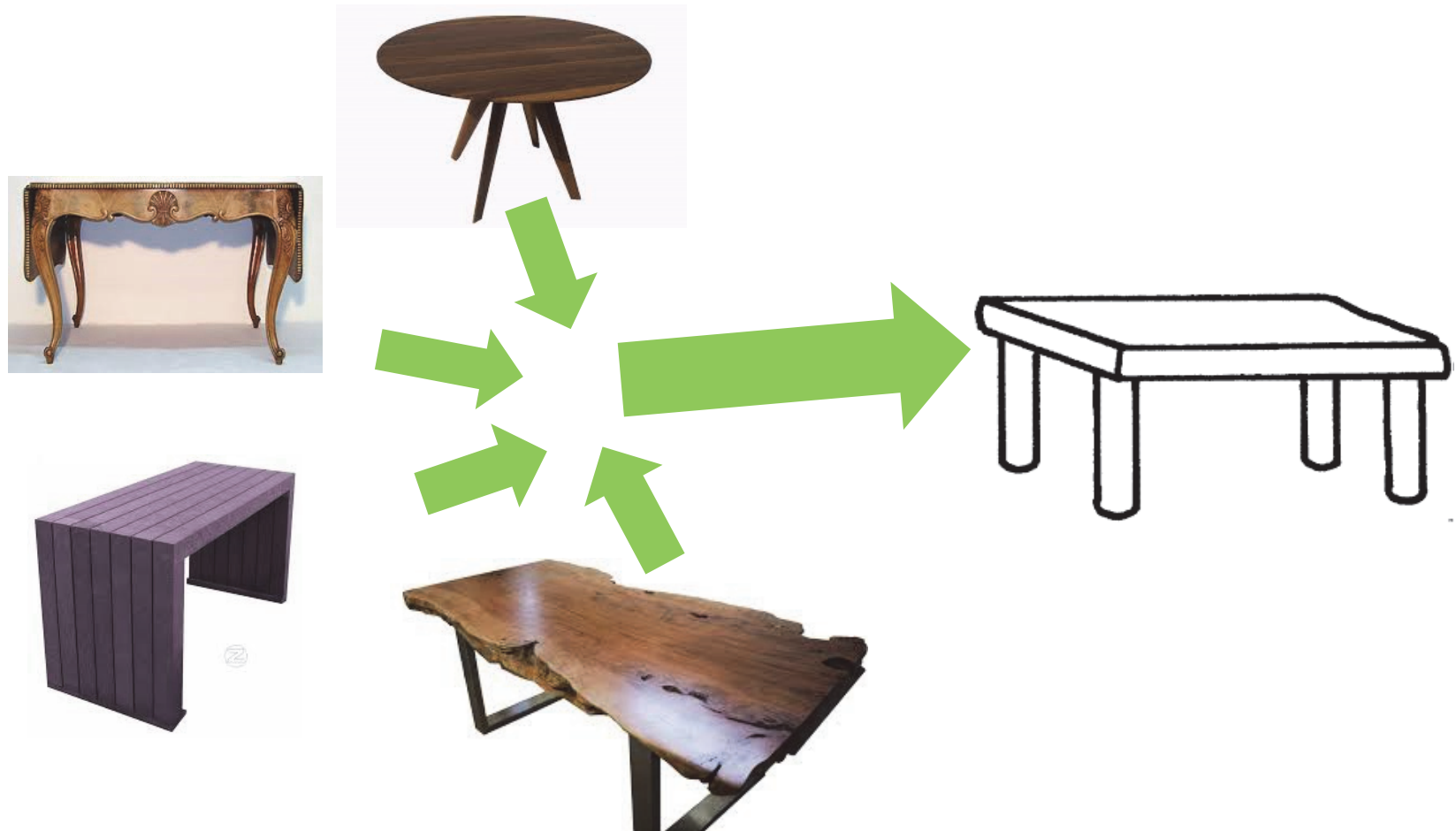
learning

motivation

outcomes

Which *THEORY* can we *APPLY*?

(1) Repeated experiences produce *meaning*.



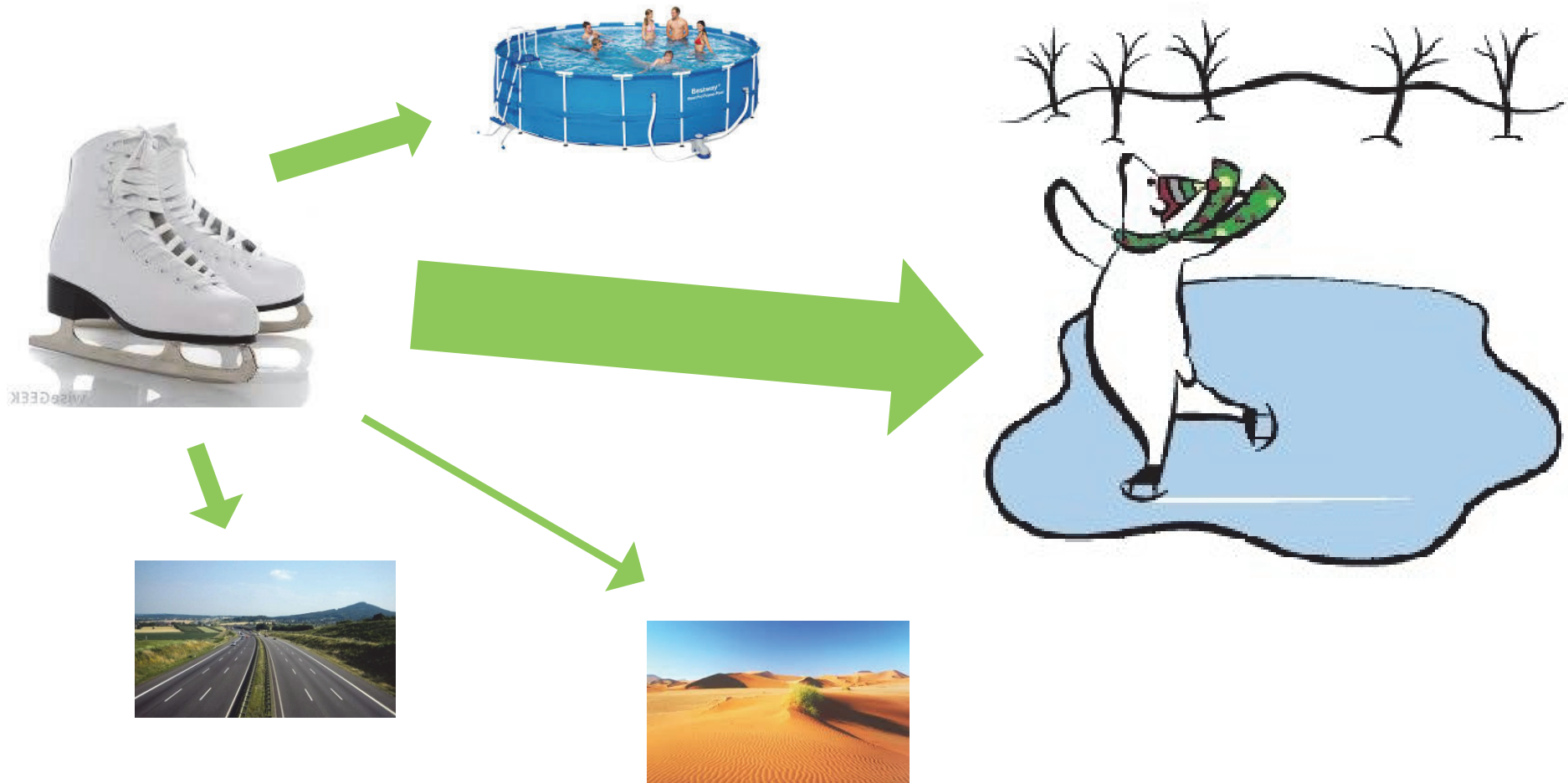
Which *THEORY* can we *APPLY*?

(2) Realistic situations boost **learning**.



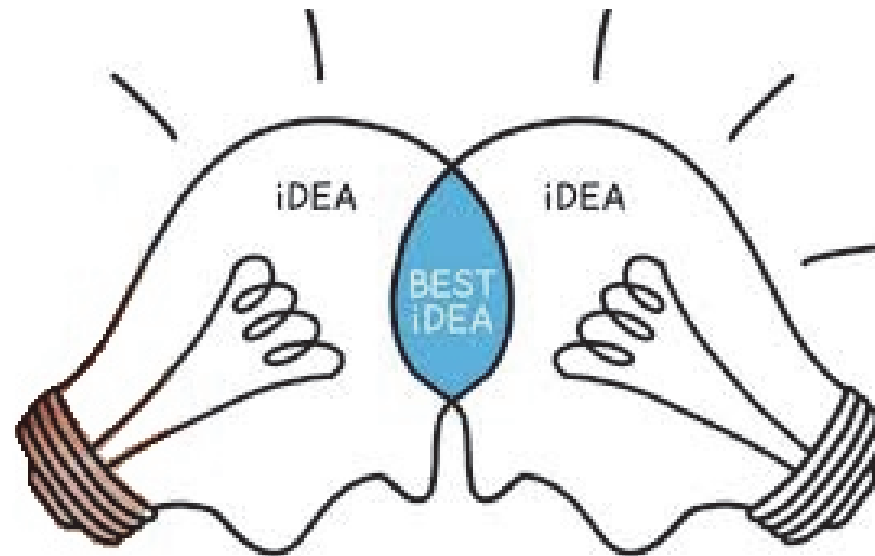
Which *THEORY* can we *APPLY*?

(3) Relevant examples / situations increase **motivation**.



Which *THEORY* can we *APPLY*?

(4) Collaboration improves learning **outcomes**.



Which **THEORY** can we **APPLY**?

Four hypotheses stimulate our reflections.

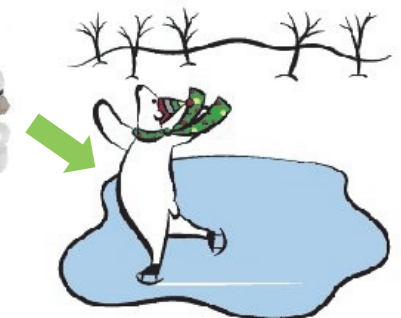
(1) Repeated experiences produce **meaning**.



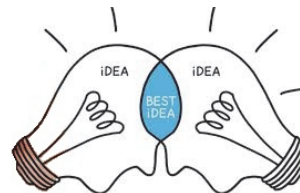
(2) Realistic situations boost **learning**.



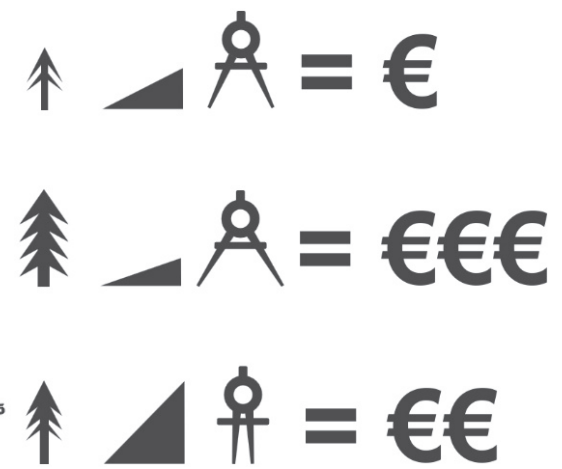
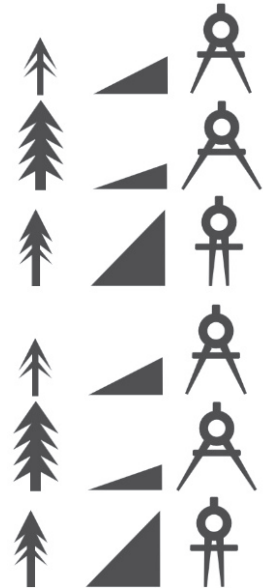
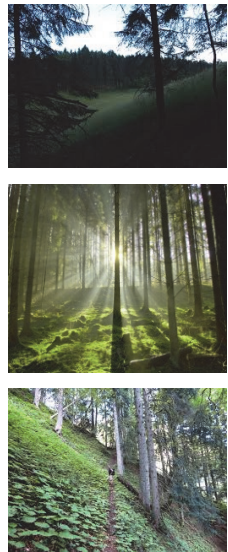
(3) Relevant examples / situations increase **motivation**.



(4) Collaboration improves learning **outcomes**.



The way to our learning outcomes



















SYNCROFALKE $\text{prod (PSH}_{15}) = k * (-22,7713 + 41,8961 * \text{baumvol})^{0,15} - 0,0046 * \text{dist} - 0,0897 * \text{neig}$

Intended learning outcomes



Which USE CASES can we cover?

Situation: Students are repeatedly solving practical problems or performing particular tasks								
#	a	b	c	d	e	f	g	h
Attributes of the situation								
Expected impact on learning outcomes								
Hypothesis								
1 repetitions								
2 situation								
3 relevance								
4 collaboration								

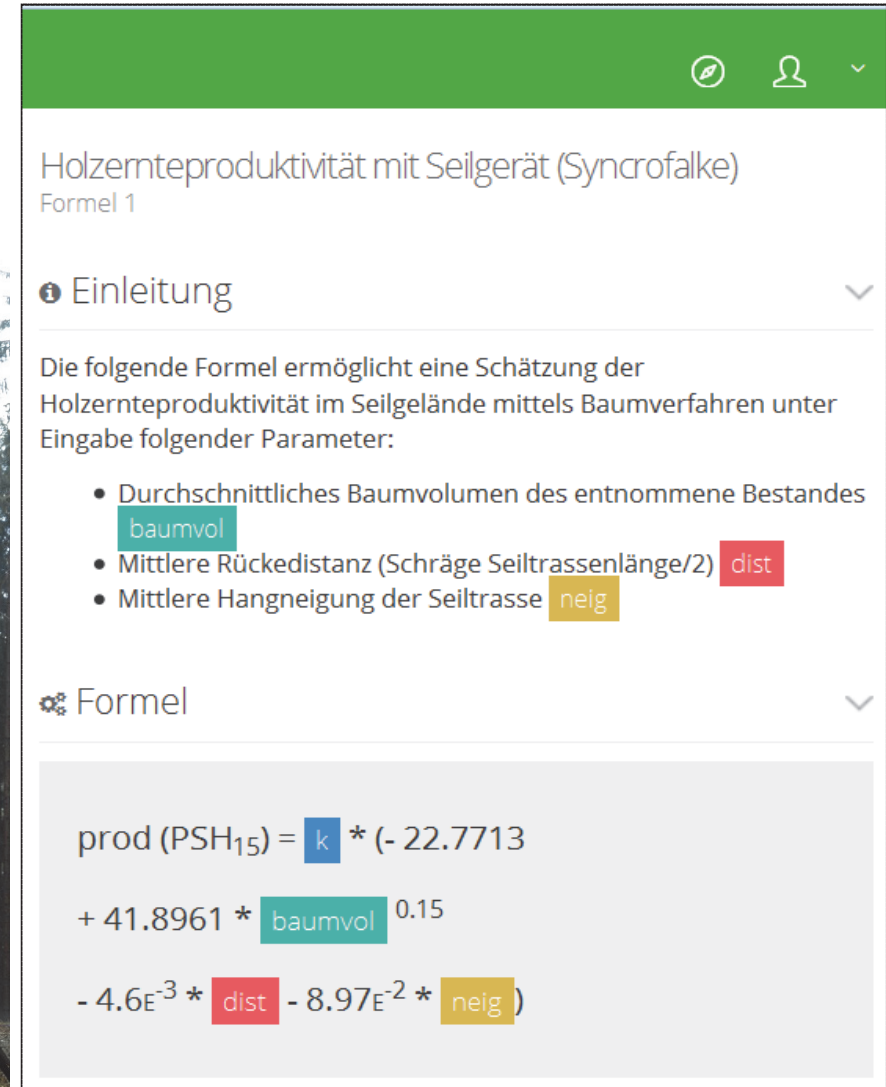
Criteria of failure vs. success

Comparison of input and outcomes		Achieved learning outcomes		
		worse	equal	better
Time investment	more	[a] Big failure	[b] Failure	[c] Interpretation necessary
	same	[d] Failure	[e] not useful	[f] Success
	less	[g] Failure	[h] Success	[i] Big success

Which TOOLS can we use?

The mobile app “BOKU grasp”

- anonymous but unique
- up to 7 changeable variables
- several tasks with every formula
- development with the teachers
- integration into existing courses
- feedback to the programmers



Holzernteproduktivität mit Seilgerät (Syncrofalke)
Formel 1

i Einleitung

Die folgende Formel ermöglicht eine Schätzung der Holzernteproduktivität im Seilgelände mittels Baumverfahren unter Eingabe folgender Parameter:

- Durchschnittliches Baumvolumen des entnommene Bestandes **baumvol**
- Mittlere Rückedistanz (Schräge Seiltrassenlänge/2) **dist**
- Mittlere Hangneigung der Seiltrasse **neig**

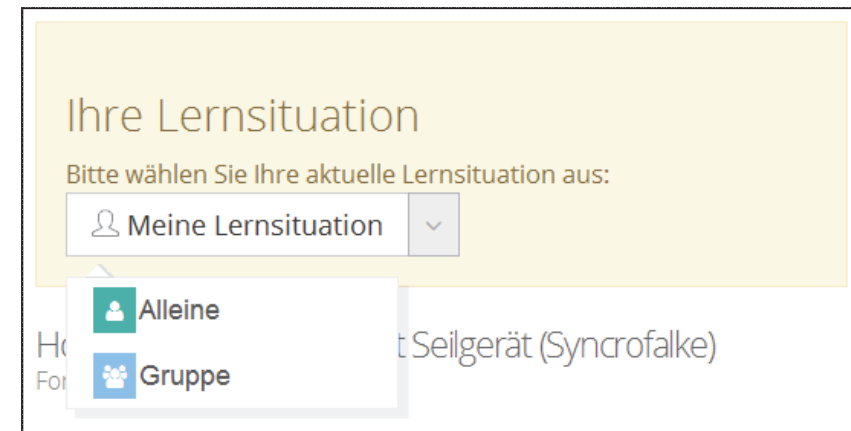
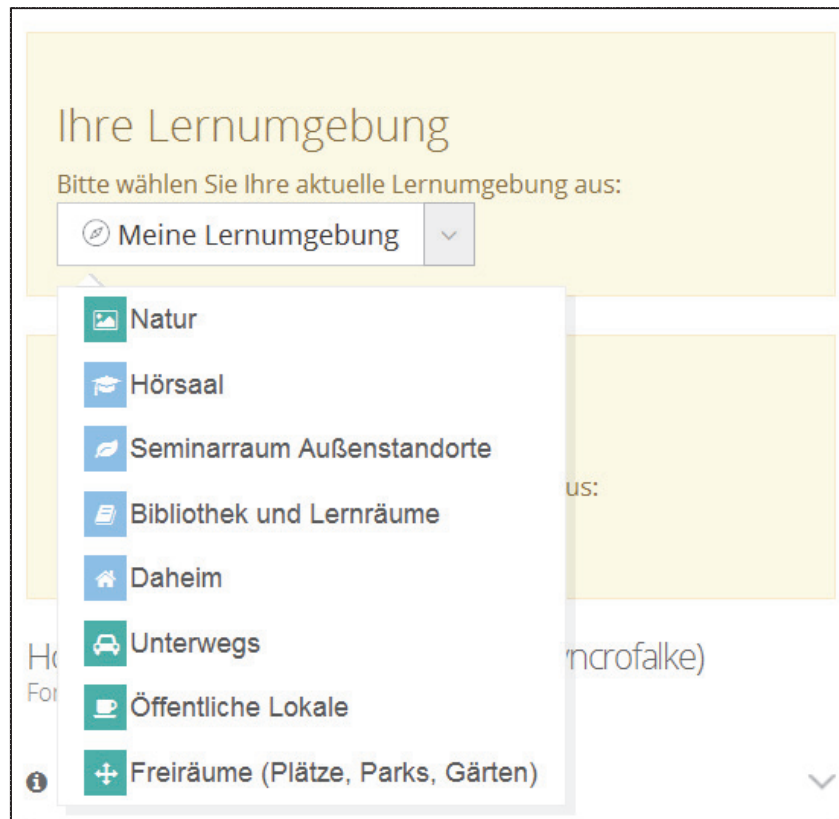
⚙ Formel

$$\text{prod (PSH}_{15}) = k * (- 22.7713 + 41.8961 * \text{baumvol}^{0.15} - 4.6E^{-3} * \text{dist} - 8.97E^{-2} * \text{neig})$$

Which TOOLS can we use?

The mobile app “BOKU grasp”

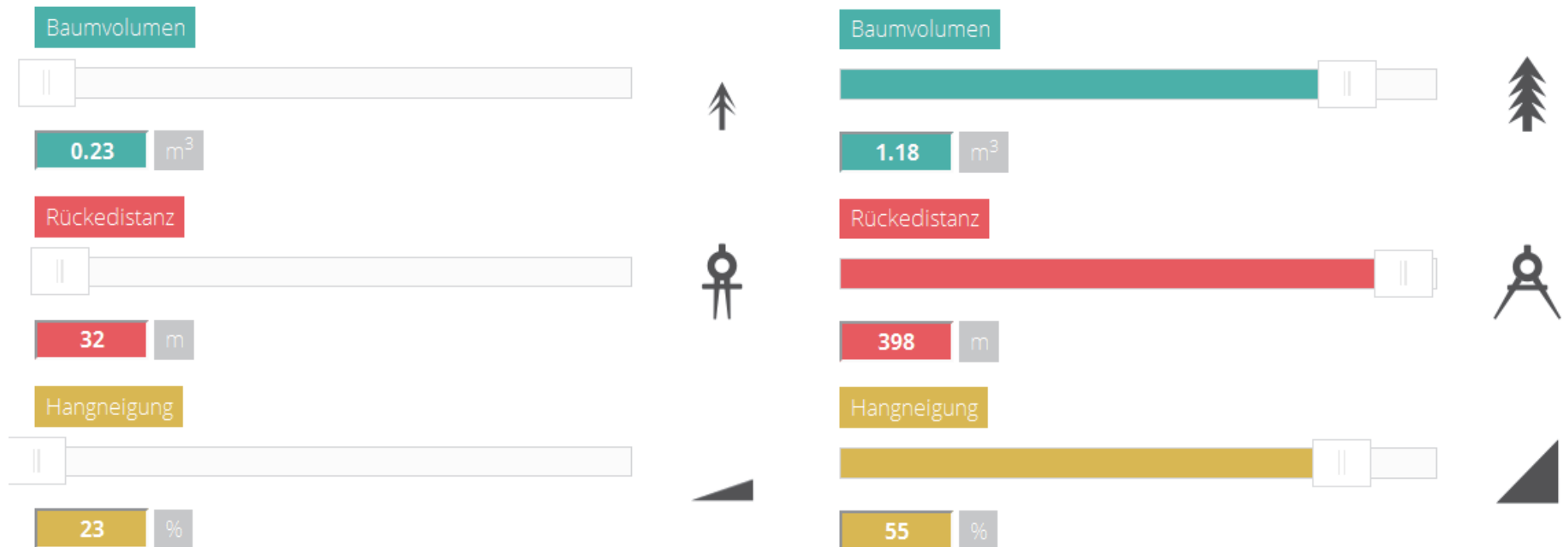
- location (lecture hall, public transport, nature, ...)
and learning setting (alone, in group) are stored



Which TOOLS can we use?

The mobile app “BOKU grasp”

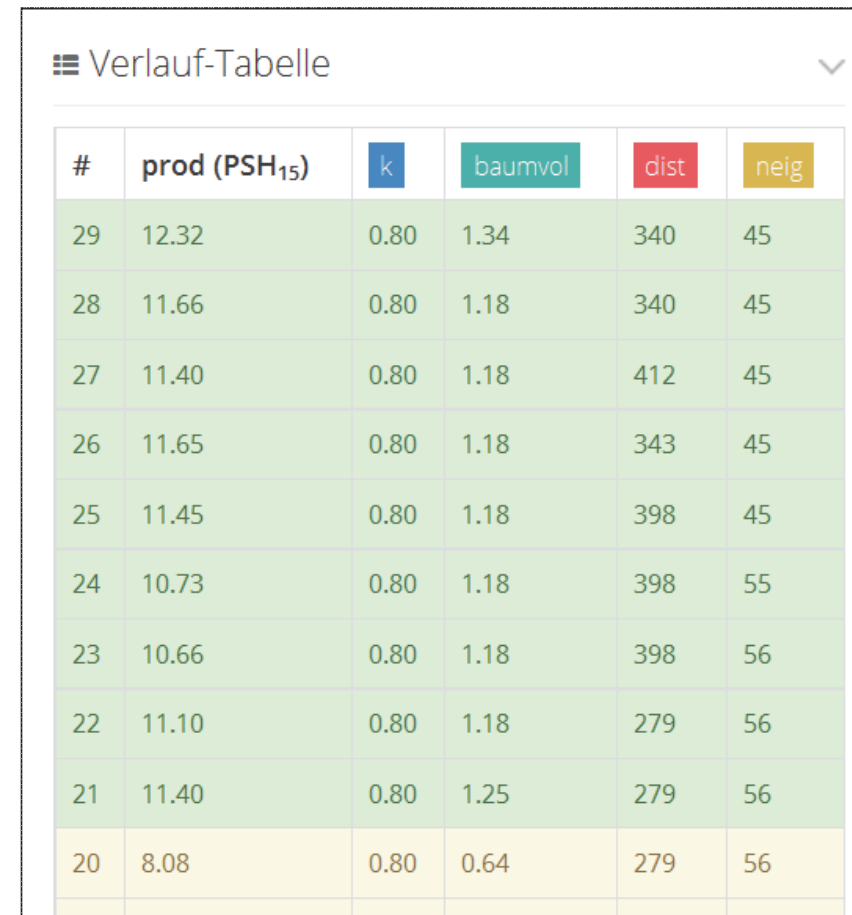
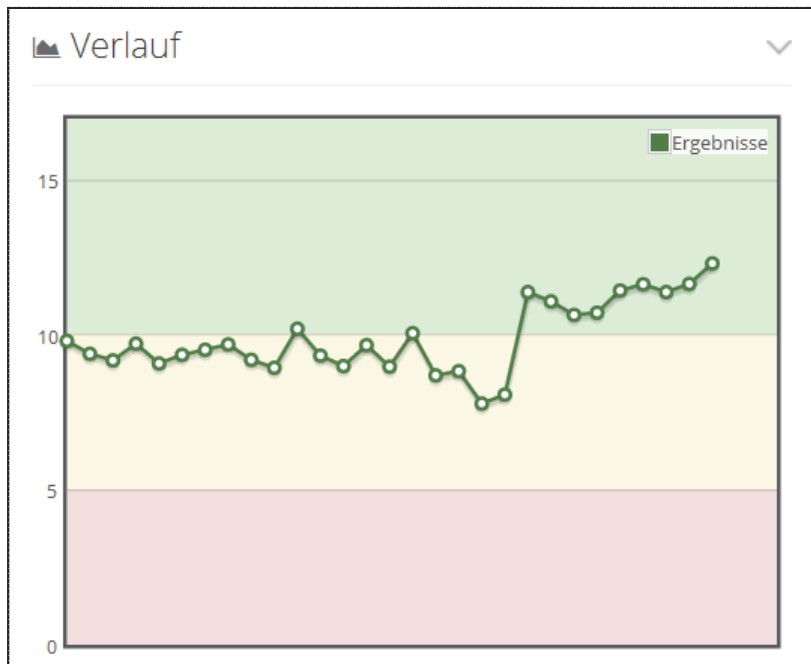
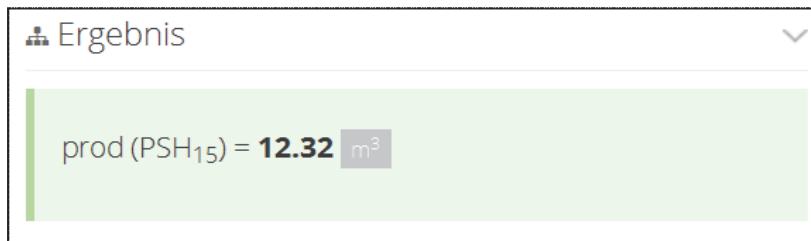
- visualisation of the variable values with colour code and icon feedback



Which TOOLS can we use?

The mobile app “BOKU grasp”

- history of the results and combinations for refaction



Verlauf-Tabelle

#	prod (PSH ₁₅)	k	baumvol	dist	neig
29	12.32	0.80	1.34	340	45
28	11.66	0.80	1.18	340	45
27	11.40	0.80	1.18	412	45
26	11.65	0.80	1.18	343	45
25	11.45	0.80	1.18	398	45
24	10.73	0.80	1.18	398	55
23	10.66	0.80	1.18	398	56
22	11.10	0.80	1.18	279	56
21	11.40	0.80	1.25	279	56
20	8.08	0.80	0.64	279	56

What are our EXPERIENCES?



- Major obstacle was the **insufficient didactical integration**
- Not enough time in the forest and therefore rather **low outdoor usage**
- A few students used it **indoor late in the evening (!)**
- Mobile website caused some problems with **low data connection** at some locations

What are our NEXT STEPS?



- Further **investigations** – questionnaire and interviews with the forest students
- **Mobile** app (data connection not needed all the time)
- **Didactical integration** – not a voluntary addition but part of the formal learning setting (dedicated tasks with points)
- More **pilot tests** with other courses

$A = R * K * LS * C * P$ (Universal Soil Loss Equation)

Contact



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