



# Integrierte Lerntechniken für Erstsemester

Prof. Dr.- Ing. Gerhard Temmel  
und  
Stefan Müller M.A.

Thementag „Gute Lehre an der WHZ“, 6.1.2016, R344, 15:30-17:30

## Anlage 1 Studienablaufplan Diplomstudium Elektrotechnik



1. Semester						
<u>Modulnr.</u>	Modul	ECTS- Punkte	SWS			
			$\Sigma$	V	VÜ	Ü Pr S
<u>ELT121</u>	Digitaltechnik	6	6	4	2	
<u>ELT101</u>	Technische Informatik	4	4	2	2	
<u>ELT122</u>	Grundlagen der Elektrotechnik I Hausaufgaben (Buddysystem) und Tutorium	6	6 (1)	6		
<u>PTI031</u>	Mathematik I Tutorium	8	8 (2)	7	1	
<u>PTI304</u>	Physik Tutorium	6	6 (1)	4	2	
<b>Summe</b>		30	30 (34)	23	7	

### Ausgangslage 2013/14:

- ➔ Studienerfolgsquote bei ET: 77 %
- ➔ Modulerfolgsquote bei GE1: zwischen 70% und 80%



Lernen ist grundsätzlich „Anschlusslernen“.

Gelernt wird nicht was einem gesagt wird,

sondern was als relevant, bedeutsam, integrierbar erlebt wird:

Erkennen, Speichern, **Abrufen**

**Erkennen**, Speichern, Abrufen

Erkennen, Speichern, Abrufen



# Stefan Müller: Vorstellung und Anwendung Lerntechniken

Themen zum Thema „Lernen“	günstige Kombination mit fachlichen Inhalten
Einführung zum Lernen	- keine Bedingungen / möglichst zum ersten Termin -
Lernen über einen längeren Zeitraum / Zeitmanagement	- keine Bedingungen / möglichst zum zweiten Termin -
Lerngruppen	- keine Bedingungen / möglichst zum dritten Termin -
Notizen während der Lehrveranstaltung / Cornell notes	Vermittlung von Fakten / Theorien / Prinzipien
Verschachteltes Üben	Vermittlung von Rechenwege, Arbeitsschritte
Analogien, Metaphern und Beispiele	Fakten / Theorien / Prinzipien
Selbsttests / Selbstabfragen	- keine Bedingungen -
Zusammenfassungen	Vermittlung von Fakten / Theorien / Prinzipien
Strukturierung und Kategorien	Vermittlung von Fakten / Theorien / Prinzipien
Lerntagebuch	- keine Bedingungen / möglichst zum letzten Termin -

Termine:

02.10.14 (Do, 9.20 Uhr)

~~09.10.14 (Do, 9.20 Uhr)~~

16.10.14 (Do, 9.20 Uhr)

23.10.14 (Do, 9.20 Uhr)

04.11.14 (Di, 13.30 Uhr)

11.11.14 (Di, 13.30 Uhr)

18.11.14 (Di, 13.30 Uhr)

25.11.14 (Di, 13.30 Uhr)

02.12.14 (Di, 13.30 Uhr)

09.12.14 (Di, 13.30 Uhr)

# Stefan Müller: Lerntechniken 1 bis 7

## 07b Fachlandkarten

Eine Fachlandkarte bietet Übersicht und Orientierung über Inhalte z. B. in Form von Begriffenetzen. Sie ist geeignet für

Lehr

Ziele

Vorg

Kläre

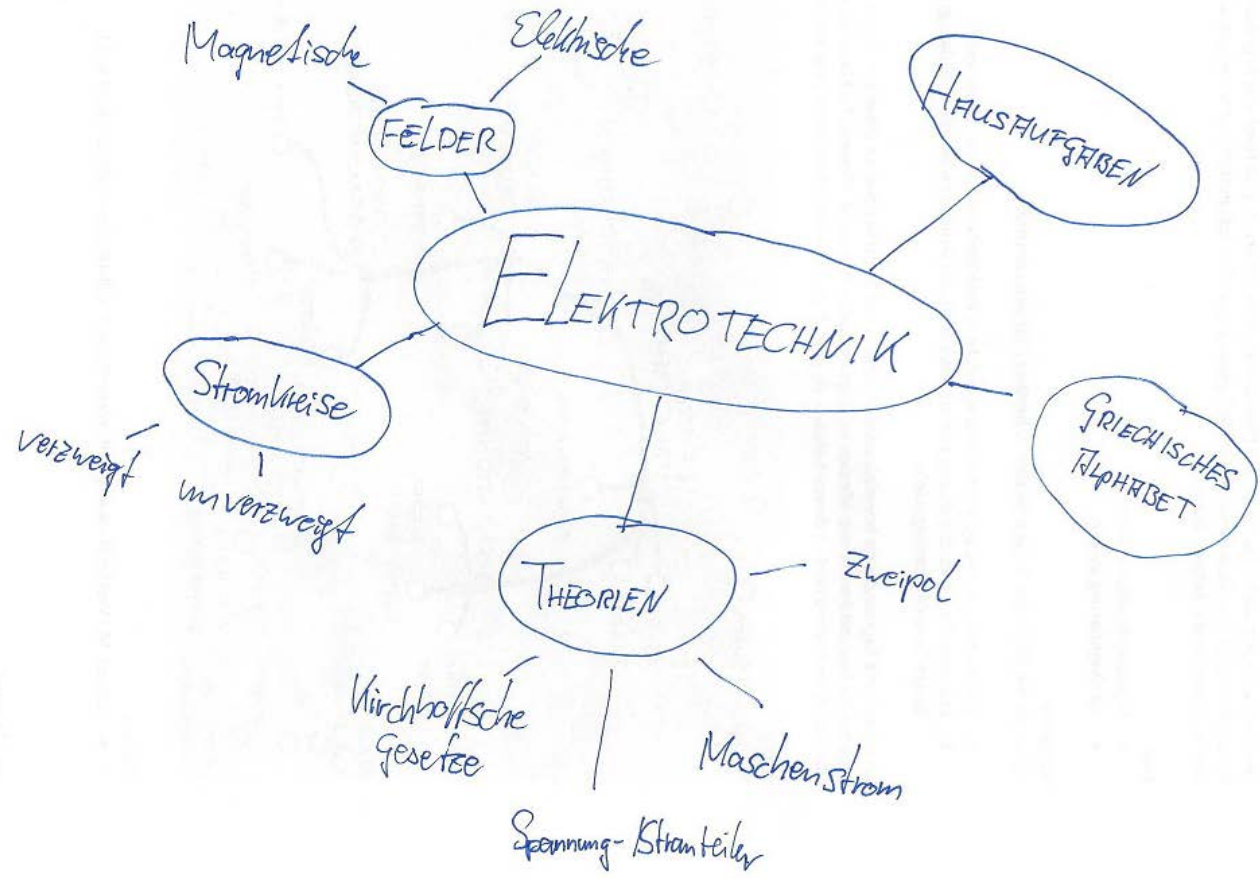
1

2

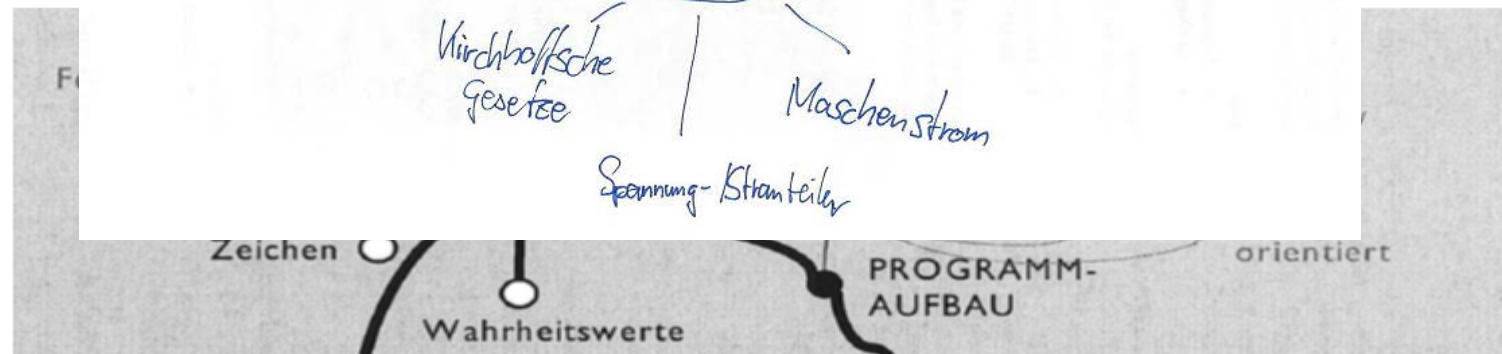
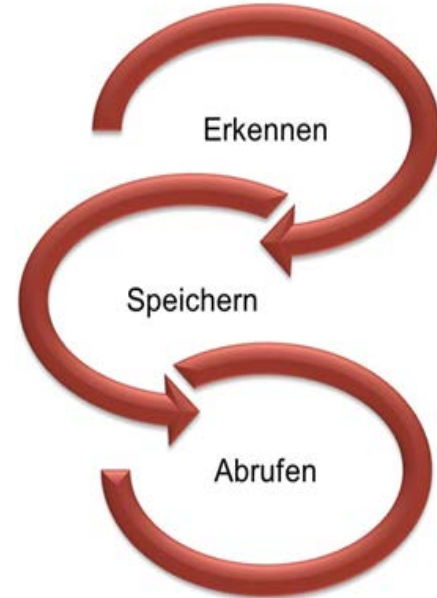
Sie k

arbe

Minc



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 n ähneln  
 :rnens.





## Das Ohmsche Gesetz

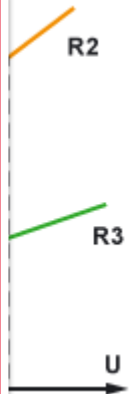
90 VÜ → 80 VÜ (- 11%)

→ Aufwand: in 11 Blocks ca. 20 min  
mit Hr. Müller (5 VÜ)  
+alle 5 Memo-Minuten je  
Doppelstunde (5 VÜ)

→ Reduktion der Vorlesungsfolien  
von 963 auf 734 Folien,  
also um 24%

\* 16.03  
† 06.07

Der  
Prop  
elek





# Umstellung auf verschachtelte Hausaufgaben

WS 2013/14	ÜBERSICHT DER abzugebenden HA (Abgabe und Rückgabe Mittwochvorles	WS 2014/15	ÜBERSICHT DER WÖCHENTLICH abzugebenden HAUSAUFGABEN GE1 (Abgabe in der Dienstagvorlesung Rückgabe in Folgevorlesungen )	
	Aufgaben der Aufgabensammlung		Aufgaben in der Aufgabensammlung Elektrotechnik	Termin
1	1.1 - 1.5	1	1.1, 1.3, 1.6,1.7, 2.1,2.2	14.10.2014
2	1.6 - 1.12	2	1.2,1.4,1.8,1.9,2.3,2.4,2.5,2.9,2.12,2.13,2.17,2.18,2.21,2.26	21.10.2014
3	2.1 - 2.11	3	1.5,1.10,2.6,2.7,2.8,2.10,2.14,2.19,2.22,2.24,2.27,2.32	28.10.2014
4	2.12 - 2.25	4	1.11, 2.11, 2.15, 2.20, 2.25, 2.28, 2.30, 2.33, 2.34	04.11.2014
5	2.26 - 2.28, 2.30-2.34	5	1.12, 2.16, 2.23, 2.31, 2.33, 2.36, 2.37	11.11.2014
6	2.36 - 3.3	6	2.35, 2.38, 2.39, 2.40, 3.1, 3.5, 3.10, 3.13	18.11.2014
7	3.4 -3.14	7	3.2, 3.4, 3.6, 3.11 , 3.14, 4.1, 4.2, 4.3	25.11.2014
8	4.1 - 4.5	8	3.7, 3.8,3.9, 3.12, 4.4, 4.5, 4.7	02.12.2014
9	4.6 - 4.9	9	4.6, 4.8, 5.1, 5.2, 5.3, 5.4, 5.5, 5.8	09.12.2014
10	5.1 - 5.7	10	4.9, 5.6, 5.9, 5.10, 5.13, 5.14, 5.16, 5.19	16.12.2014
11	5.8 - 5.12	11	5.7, 5.11, 5.12, 5.15, 5.15, 5.18	13.01.2015
12	5.13 - 5.19	12	letzte HÜ-Aufgaben korrigiert zurück	20.01.2015
13	letzte HÜ-Aufgaben korrigiert zurück		15.01.2014	



# Abgabeübersicht wöchentliche HÜ

GE 1		09.10.2013	16.10.2013	23.10.2013	30.10.2013	06.11.2013	13.11.2013	27.11.2013	04.12.2013	11.12.2013	08.01.2014	15.01.2014	22.01.2014
Ifd. Nr.													
1	132048	90%	90%	90%	0%	80%	80%	85%	100%	100%	0%	0%	0%
2	132048	10%	95%	0%	65%	90%	50%	0%	70%	90%	90%	85%	100%
3	132048	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
4	132048	20%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
5	132048	100%	95%	95%	95%	70%	80%	100%	100%	100%	100%	90%	80%
6	132048	100%	85%	95%	70%	0%	70%	70%	0%	0%	0%	0%	0%
7	132048	100%	100%	100%	100%	80%	50%	80%	100%	100%	95%	90%	0%
8	132048	90%	100%	100%	95%	90%	85%	100%	100%	100%	100%	90%	0%
9	132048	100%	100%	90%	90%	70%	60%	100%	100%	95%	100%	100%	100%
10	132048	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
11	132048	100%	100%	75%	95%	95%	0%	80%	90%	90%	100%	90%	100%
12	132048	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
13	132048	100%	100%	95%	90%	70%	100%	0%	90%	100%	100%	100%	0%
14	132048	85%	60%	70%	0%	60%	0%	0%	0%	0%	0%	0%	0%
15	132048	100%	95%	90%	95%	80%	0%	90%	90%	100%	90%	0%	0%
16	132048	85%	100%	100%	100%	70%	80%	100%	100%	90%	90%	95%	0%
17	132048	100%	100%	50%	100%	70%	80%	0%	100%	80%	100%	0%	0%
18	132048	95%	100%	100%	95%	85%	95%	100%	100%	95%	90%	90%	100%
19	132048	0%	95%	80%	0%	0%	0%	0%	0%	0%	0%	0%	0%
20	132048	90%	70%	100%	60%	50%	0%	60%	0%	0%	0%	0%	0%
21	132048	100%	100%	100%	90%	80%	80%	100%	100%	95%	100%	90%	95%
22	132048	90%	0%	100%	90%	60%	95%	80%	100%	95%	100%	95%	90%
1	132222	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
2	132222	90%	100%	95%	0%	70%	80%	0%	0%	0%	0%	0%	0%
3	132222	0%	80%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
4	132222	95%	100%	95%	85%	60%	70%	80%	50%	80%	100%	80%	100%
5	132222	95%	100%	100%	100%	30%	30%	90%	100%	95%	100%	0%	0%
6	132222	95%	100%	100%	95%	50%	30%	30%	0%	0%	50%	0%	0%
7	132222	95%	90%	95%	95%	50%	85%	0%	50%	80%	0%	0%	0%
8	132222	95%	100%	100%	80%	50%	50%	80%	70%	0%	0%	0%	70%
9	132222	90%	50%	50%	0%	40%	30%	20%	90%	70%	0%	0%	0%
10	132222	95%	95%	95%	100%	100%	80%	90%	90%	85%	90%	0%	0%
11	132222	100%	100%	90%	95%	90%	80%	80%	80%	100%	70%	0%	90%
1	132702	85%	95%	95%	0%	0%	0%	0%	0%	0%	0%	0%	0%
2	132702	100%	95%	100%	95%	100%	100%	100%	90%	100%	90%	0%	0%
3	132702	90%	95%	95%	95%	100%	90%	100%	100%	95%	100%	0%	0%
4	132702	100%	100%	100%	100%	95%	100%	100%	100%	100%	100%	100%	100%
5	132702	0%	100%	70%	70%	0%	60%	0%	100%	0%	0%	0%	0%
6	132702	85%	85%	95%	95%	85%	95%	90%	90%	100%	90%	0%	0%
7	132702	85%	95%	60%	0%	75%	0%	0%	0%	0%	0%	0%	0%
8	132702	90%	95%	100%	0%	90%	100%	100%	100%	100%	100%	90%	100%
9	132702	100%	90%	0%	0%	0%	20%	40%	90%	60%	0%	0%	0%
10	132702	100%	95%	95%	95%	70%	80%	100%	0%	100%	100%	0%	0%
11	132702	85%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
12	132702	100%	85%	100%	100%	90%	100%	95%	100%	100%	100%	90%	100%
13	132702	90%	95%	90%	0%	90%	100%	100%	100%	90%	100%	90%	100%
GE1 Abgabe - Durchschnitt		76%	79%	73%	57%	55%	50%	53%	60%	58%	55%	39%	33%

GE 1		20.10.2015		27.10.2015		03.11.2015		10.11.2015		17.11.2015		24.11.2015		01.12.2015		08.12.2015		15.12.2015		12.01.2016		
Studierende		Abgabe	Richtig	Abgabe	Richtig	Abgabe	Richtig	Abgabe	Richtig	Abgabe	Richtig	Abgabe	Richtig	Abgabe	Richtig	Abgabe	Richtig	Abgabe	Richtig	Abgabe	Richtig	
1		100%	100%	100%	100%	100%	100%	100%	95%	100%	100%	0%	0%	100%	100%	100%	100%	95%	100%	80%	90%	
2		100%	100%	100%	100%	100%	100%	100%	95%	100%	100%	0%	0%	100%	100%	100%	100%	95%	100%	80%	90%	
3		100%	100%	100%	90%	100%	100%	90%	90%	95%	100%	100%	95%	90%	100%	100%	100%	95%	95%	100%	100%	
4		100%	100%	100%	90%	100%	100%	90%	90%	95%	100%	90%	90%	100%	100%	100%	100%	95%	95%	100%	100%	
5		100%	100%	100%	95%	90%	95%	100%	95%	85%	90%	90%	95%	100%	100%	100%	90%	95%	100%	100%	100%	
6		100%	100%	100%	95%	90%	95%	100%	95%	85%	90%	90%	95%	100%	100%	100%	90%	95%	100%	100%	100%	
7		100%	100%	100%	95%	90%	95%	100%	95%	85%	90%	90%	95%	100%	100%	100%	90%	95%	100%	100%	100%	
8		100%	100%	100%	95%	100%	100%	95%	95%	100%	100%	100%	90%	100%	100%	100%	90%	100%	100%	100%	100%	
9		100%	100%	100%	95%	100%	100%	95%	95%	100%	100%	100%	90%	100%	100%	100%	90%	100%	100%	100%	100%	
10		100%	100%	100%	95%	100%	100%	95%	95%	100%	100%	100%	90%	100%	100%	100%	90%	100%	100%	100%	100%	
11		100%	95%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
12		100%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
13		70%	80%	100%	95%	100%	95%	90%	100%	85%	100%	85%	85%	85%	100%	100%	95%	95%	100%	100%	100%	
14		70%	70%	100%	95%	100%	95%	90%	100%	85%	100%	85%	85%	85%	100%	100%	95%	95%	100%	100%	100%	
15		100%	100%	100%	95%	95%	90%	85%	90%	95%	90%	100%	100%	90%	100%	100%	95%	90%	100%	0%	0%	
16		100%	100%	80%	95%	95%	90%	85%	90%	95%	90%	100%	100%	90%	100%	100%	95%	90%	100%	75%	100%	
17		100%	100%	100%	100%	95%	95%	100%	95%	100%	100%	100%	100%	100%	100%	100%	95%	100%	100%	100%	100%	
18		100%	100%	100%	100%	95%	95%	100%	95%	100%	100%	100%	100%	100%	100%	100%	95%	100%	100%	100%	100%	
19		100%	100%	100%	95%	100%	90%	100%	95%	95%	95%	100%	95%	90%	100%	100%	100%	95%	100%	85%	95%	
20		100%	100%	100%	95%	95%	95%	100%	95%	95%	95%	100%	95%	90%	100%	100%	100%	85%	100%	0%	0%	
21		100%	100%	100%	100%	95%	90%	100%	95%	100%	100%	100%	100%	90%	100%	100%	100%	100%	100%	100%	100%	
22		100%	100%	100%	100%	95%	90%	100%	95%	100%	100%	100%	100%	90%	100%	100%	100%	100%	100%	100%	100%	
23		100%	70%	100%	70%	90%	85%	80%	95%	95%	100%	100%	100%	90%	100%	100%	100%	100%	100%	100%	100%	
24		100%	100%	100%	100%	90%	100%	100%	90%	100%	100%	100%	100%	90%	100%	100%	100%	100%	100%	100%	100%	
25		100%	100%	100%	100%	90%	100%	100%	90%	100%	100%	100%	100%	90%	100%	100%	100%	100%	100%	100%	100%	
26		80%	90%	100%	95%	80%	95%	100%	95%	90%	85%	90%	85%	90%	100%	100%	95%	90%	90%	85%	90%	
27		100%	95%	100%	95%	80%	95%	100%	95%	90%	85%	90%	85%	90%	100%	100%	95%	90%	90%	85%	90%	
28		100%	100%	100%	95%	90%	100%	100%	95%	100%	100%	100%	95%	90%	100%	100%	100%	90%	90%	80%	95%	
29		100%	100%	100%	95%	90%	100%	100%	95%	100%	100%	100%	95%	90%	100%	100%	100%	90%	90%	80%	95%	
30		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
31		100%	100%	100%	95%	100%	100%	100%	95%	100%	100%	100%	95%	100%	100%	100%	95%	100%	95%	100%	95%	
32		100%	100%	100%	100%	100%	100%	100%	100%	95%	100%	100%	100%	95%	100%	100%	90%	95%	95%	100%	95%	
33		100%	100%	100%	95%	100%	100%	100%	95%	100%	100%	100%	95%	100%	100%	90%	95%	95%	100%	100%	95%	
34		100%	90%	100%	95%	95%	90%	95%	95%	90%	95%	95%	90%	95%	95%	90%	100%	85%	100%	100%	0%	0%
35		100%	90%	100%	95%	95%	90%	95%	95%	90%	95%	95%	95%	95%	95%	95%	100%	85%	100%	100%	0%	0%
36		85%	100%	90%	95%	75%	95%	90%	90%	75%	95%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
37		0%	0%	70%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Abgabe-Du		95%	94%	91%	87%	86%	88%	88%	86%	87%	89%	81%	78%	84%	89%	91%	85%	88%	90%	74%	76%	
Skala		0% - 40%		> 40% bis < 80%			80% bis 100%															

Einzelabgabe, Sollabgabe

Mit Buddysystem, dafür Pflicht





## Erreichtes Gesamtziel

Prüfungsergebnisse: GE1-schriftliche Prüfung					
	WS2013/14		WS2014/15		Vergleich
Note	Anzahl Studenten/in		Anzahl Studenten/in		
1	6	15%	8	24%	Verbesserung
2	5	13%	5	15%	leichte Verbesserung
3	7	18%	6	18%	gleich
4	13	33%	11	33%	gleich
5	8	21%	3	9%	deutliche Verbesserung
	<b>39</b>	<b>100%</b>	<b>33</b>	<b>100%</b>	
	Vorjahr		Mit Lerntechniken		<b>insgesamt signifikante Verbesserung</b>
<b>Positiv:</b>		<b>79%</b>		<b>91%</b>	

	2011/12	2012/13	2013/14	2014/15	2016
Positiv	72%	81%	79%	<b>91%</b>	<b>85%</b>



# Rückmeldung/Einschätzung der Studierenden

Themen zum Thema „Lernen“	
Einführung zum Lernen	
Lernen über einen längeren Zeitraum / Zeitmanagement	<b>2,4</b>
Lerngruppen	<b>2,7</b>
Notizen während der Lehrveranstaltung / Cornell notes	
Verschachteltes Üben	<b>2,3</b>
Analogien, Metaphern und Beispiele	
Selbsttests / Selbstabfragen	<b>2,2</b>
Zusammenfassungen	
Strukturierung und Kategorien	<b>2,3</b>
Lerntagebuch	<b>2,3</b>

- von 92 % der Studierenden als „sinnvoll“ bewertet
- starkes Interesse an Vielfalt und Wirksamkeit von Lerntechniken

## Weitere Faktoren:

- ✓ Besserer Zugang zu den Studierenden (Offenheit, Kommunikation, Toleranz)
- ✓ Aktivere Studierende (in der Vorlesung)