



Workshop E-Assessment **Kompetent Prüfen am PC**

Karsten D. Wolf

Fachbereich 12

Didaktische Gestaltung multimedialer Lernumgebungen

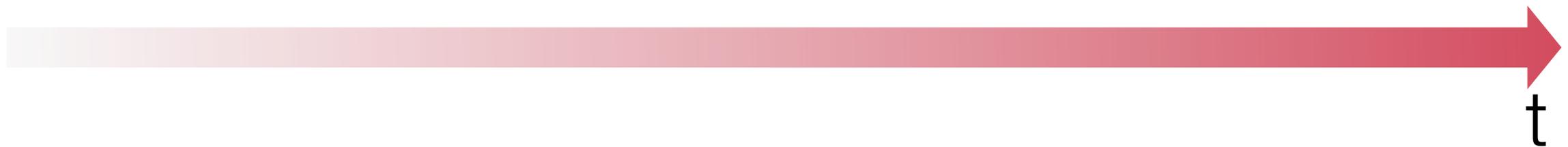
ZMML 7.06.2010

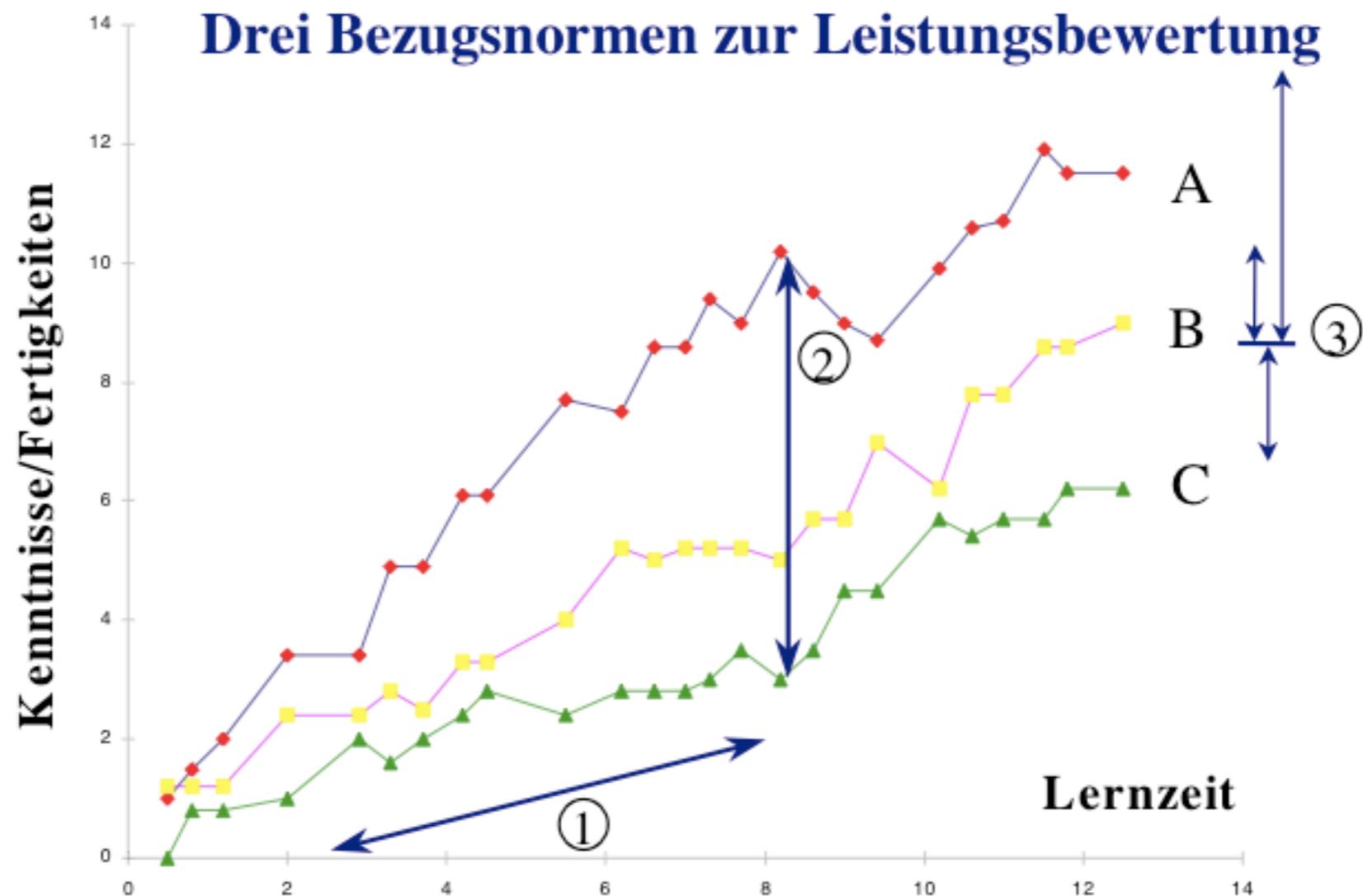
Themenspektrum?

- **Grundsätzliche Überlegungen** zum Testen
- **Formative und alternative Prüfungsverfahren**
- Was macht einen Test gut? (Testtheorie)
- **Test Wiseness** und Tipps zur Qualität der Fragen
- **Taxonomiestufen**
- **Gestaltung von MC Fragen**

Traditionelles Modell der Leistungsbewertung

Unterricht	Leistungsprüfung und Bewertung		Leistungs- dokumentation
lehrer- zentrierter darstellender Unterricht	Klausur mdl. Examen Hausarbeit ...	Note	Ziffernzeugnis





- 1 = individuelle Bezugsnorm
- 2 = soziale Bezugsnorm
- 3 = sachliche Bezugsnorm

A, B, C = Schüler mit unterschiedlichem Lerntempo

Schlussfolgerung

Klingt einfach, ist es aber nicht:

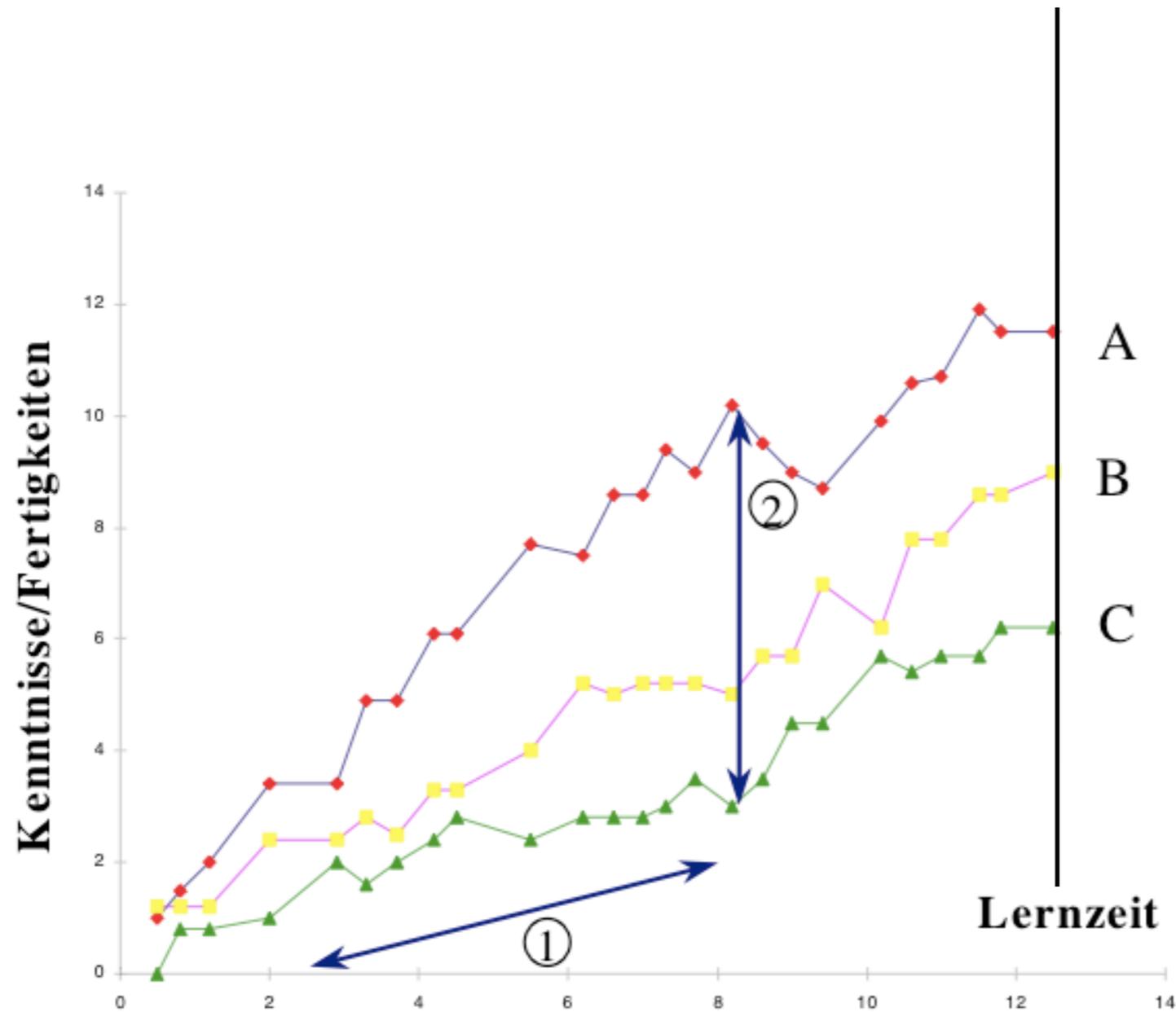
Kombination der drei Bezugsnormen!

Soziale + individuelle BZN positiv auf Leistungsmoti

Sachliche + individuelle in der Erforschung...

Ziel lehrzielorientierte Prüfverfahren

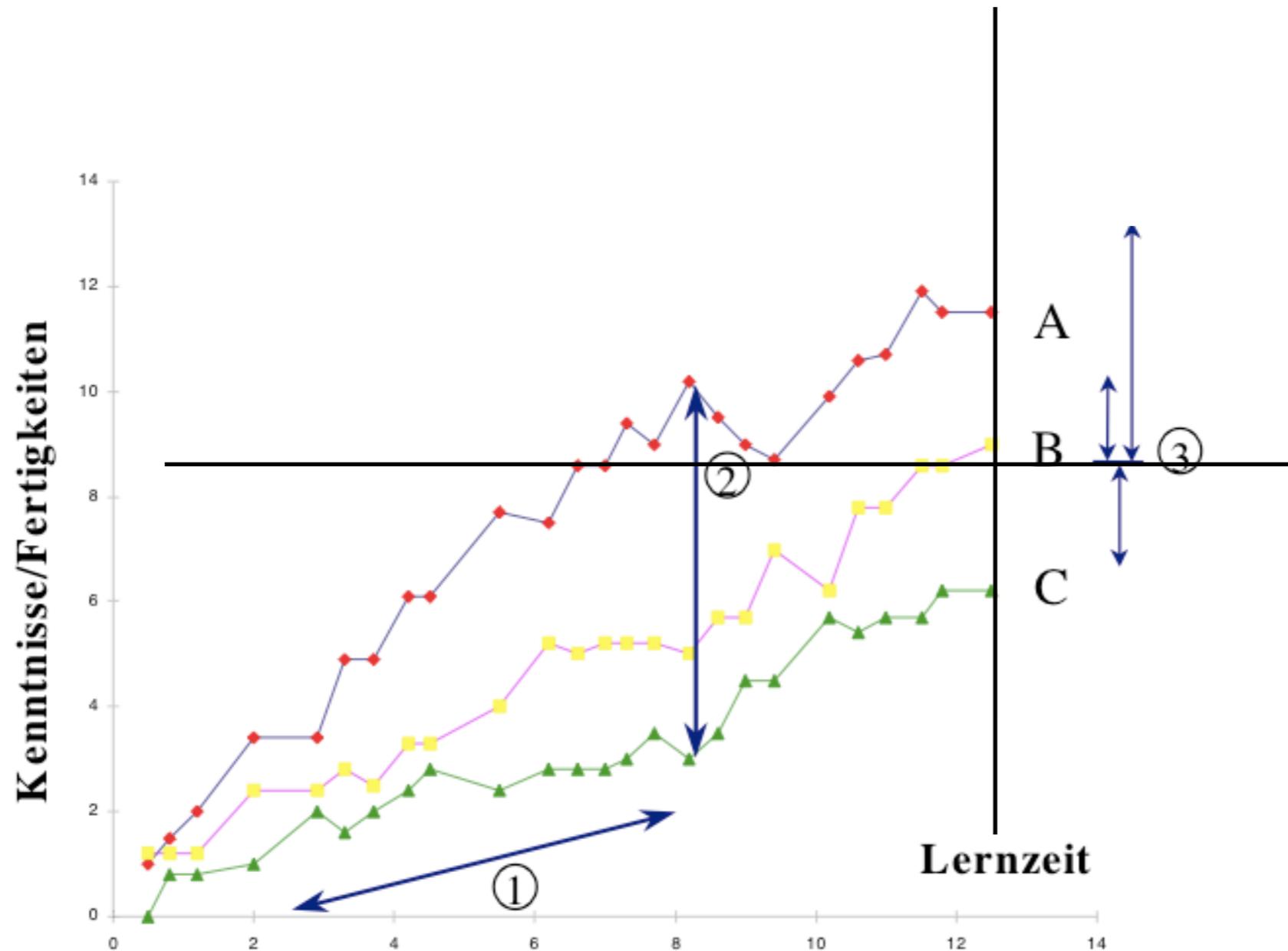
Bezugsnormen zur Leistungsbewertung



- 1 = individuelle Bezugsnorm
- 2 = soziale Bezugsnorm
- 3 = sachliche Bezugsnorm

A, B, C = Schüler mit unterschiedlichem Lerntempo

Bezugsnormen zur Leistungsbewertung

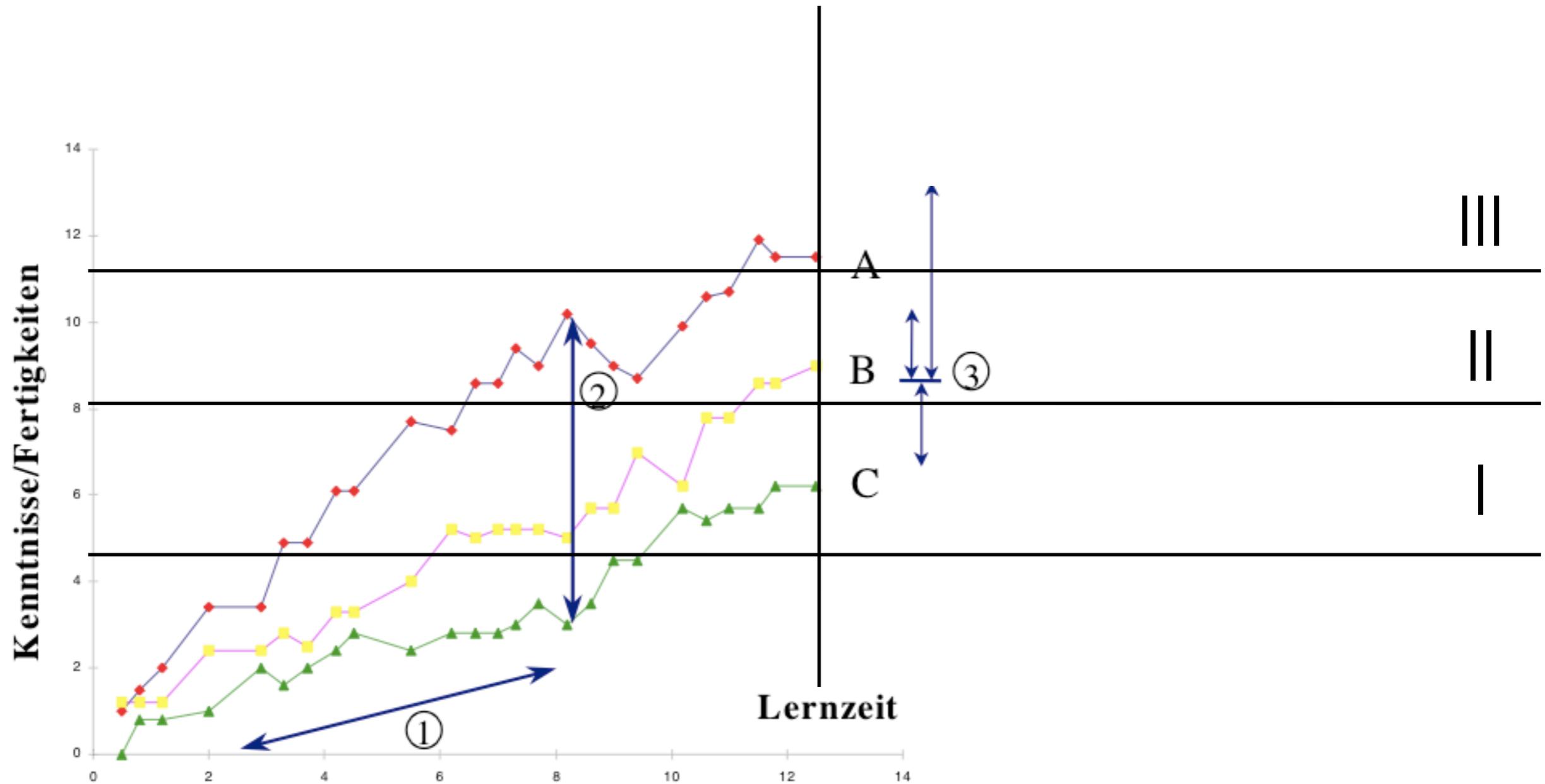


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Quelle: Falko Rheinberg

Bezugsnormen zur Leistungsbewertung

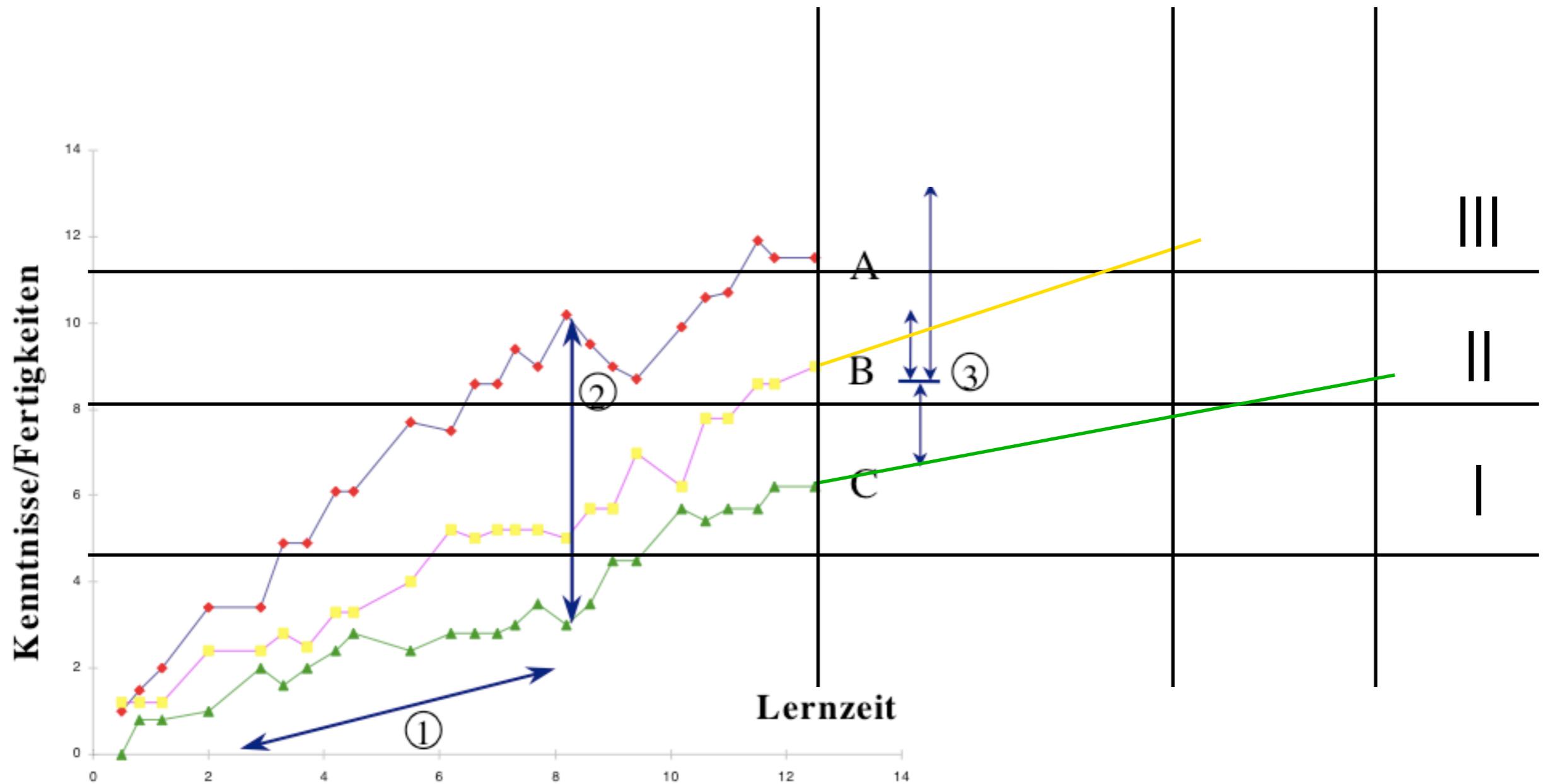


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A, B, C = Schüler mit unterschiedlichem Lerntempo

Quelle: Falko Rheinberg

Entkopplung Veranstaltung & Prüfung



- 1 = individuelle Bezugsnorm
- 2 = soziale Bezugsnorm
- 3 = sachliche Bezugsnorm

A, B, C = Schüler mit unterschiedlichem Lerntempo

Alternative Assessment *for* Learning

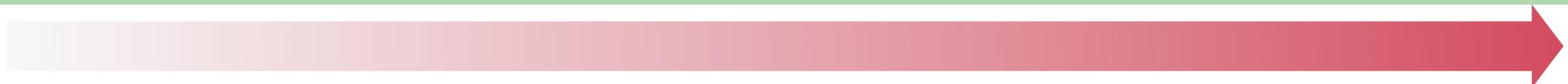
Unterricht: Leistungsdokumentation:
Leistungsprüfung und Leistungsbewertung:

erweiterte Lehr-
und Lernformen

dialogisch
inhaltlich
diagnostisch

direkte
Dokumentation
(Portfolio)

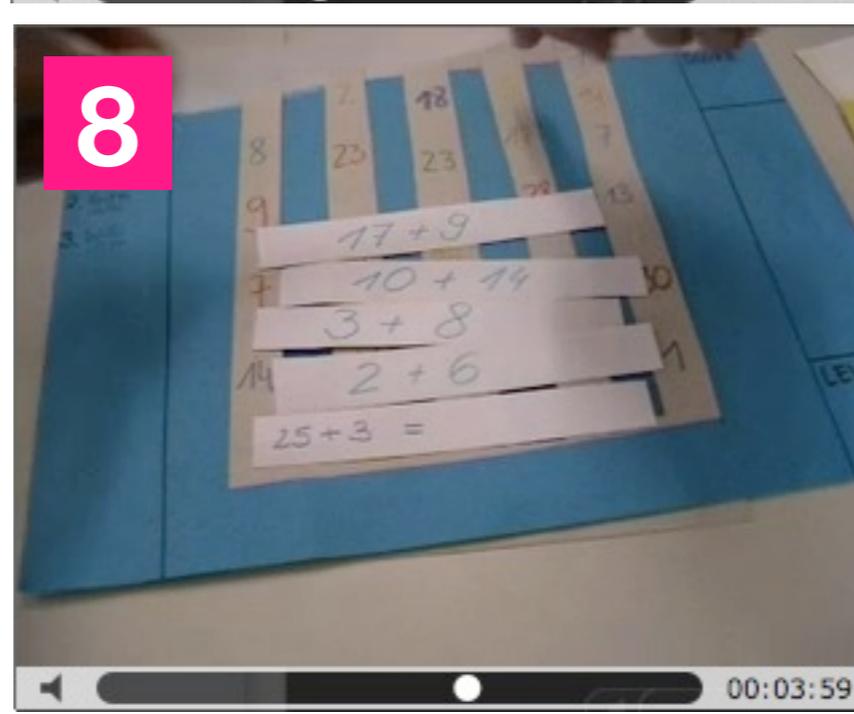
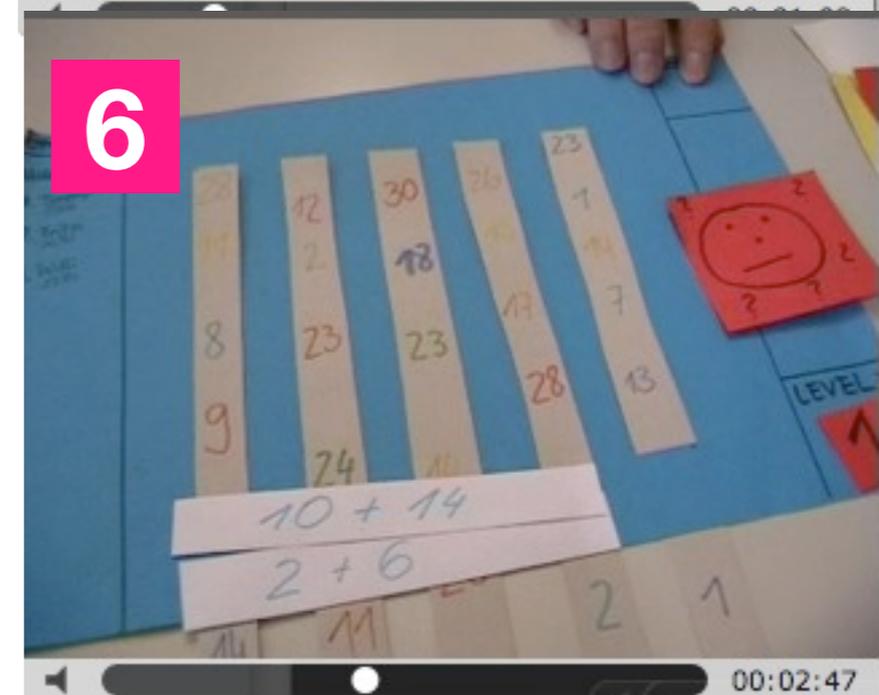
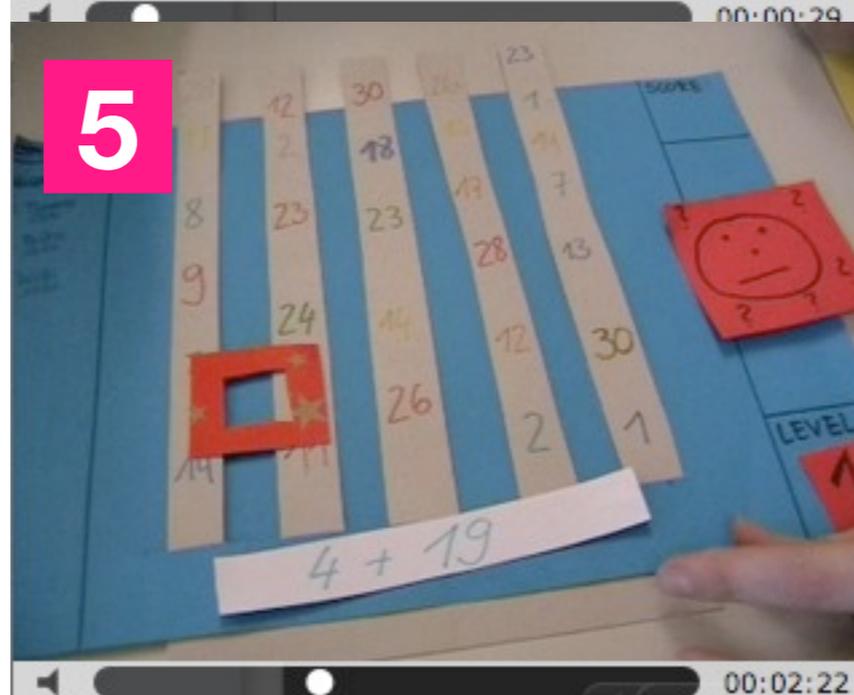
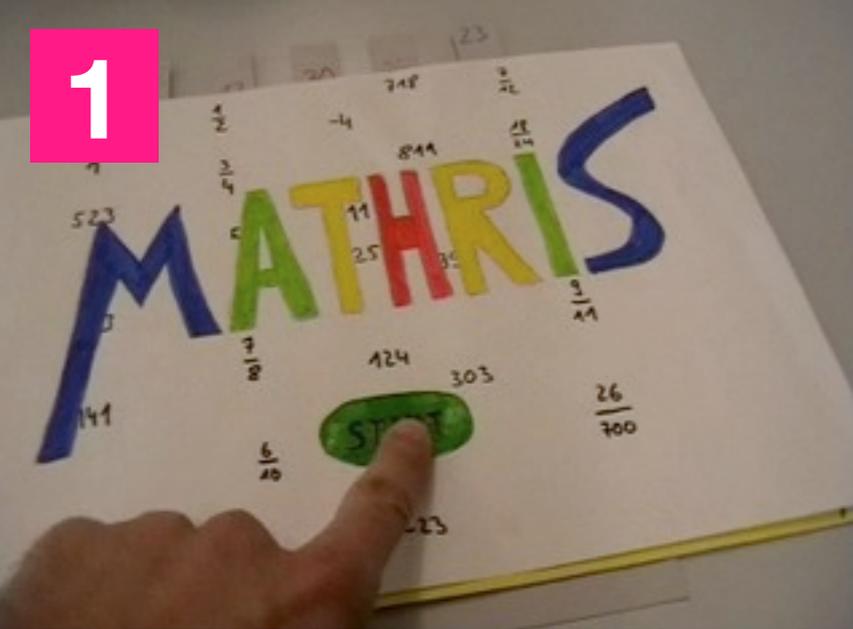
LEISTUNGSPRÄSENTATION



t

„Neue“ Methoden des alternative assessments

- **Portfolio**
- **Lernkontrakte**
- **Beobachtungen im Prozess**
- **Selbstbewertung, wechselseitige Bewertung & beauftragte Bewertung**
- **Lerntagebücher**
- **Leistungspräsentation**
- **Rückmeldebögen (Rubrics)**
- **Zertifikate**
- **Verzicht auf (Ziffer-)Noten**



Blackletter Type

TYPE BOLD

Formative Assessment

"R" you ready?

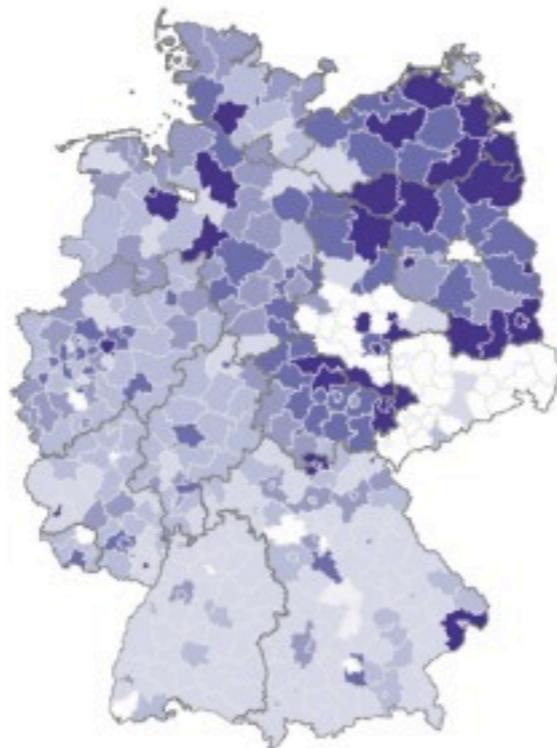
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Infomaps using R – Visualizing German unemployment rates by district on a map

16nov09



Lately, David Smith from [REvolution Computing](#) set out to [challenge the R community](#) with the reproduction of a beautiful choropleth map (= multiple regions map/thematic map) on US unemployment rates he had seen on the [Flowing Data blog](#). [Here](#) you can find the impressive results. Being a fan of beautiful visualizations I tried to produce a similar map for Germany.

1. Getting the spatial country data

The first step resulted in getting data to draw a map of the German administrative districts. Unfortunately, the maps for Germany do not come along in the `map` package, which would mean I could easily adopt the code results from the challenge. Getting data: The [GADM database of Global Administrative Areas](#) has the aim to provide data of administrative districts for the whole world on different levels (country, state and county level). The data can be downloaded as as a

November 2009

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9 10 11 12 13 14 15

16 17 18 19 20 21 22

23 24 25 26 27 28 29

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archives

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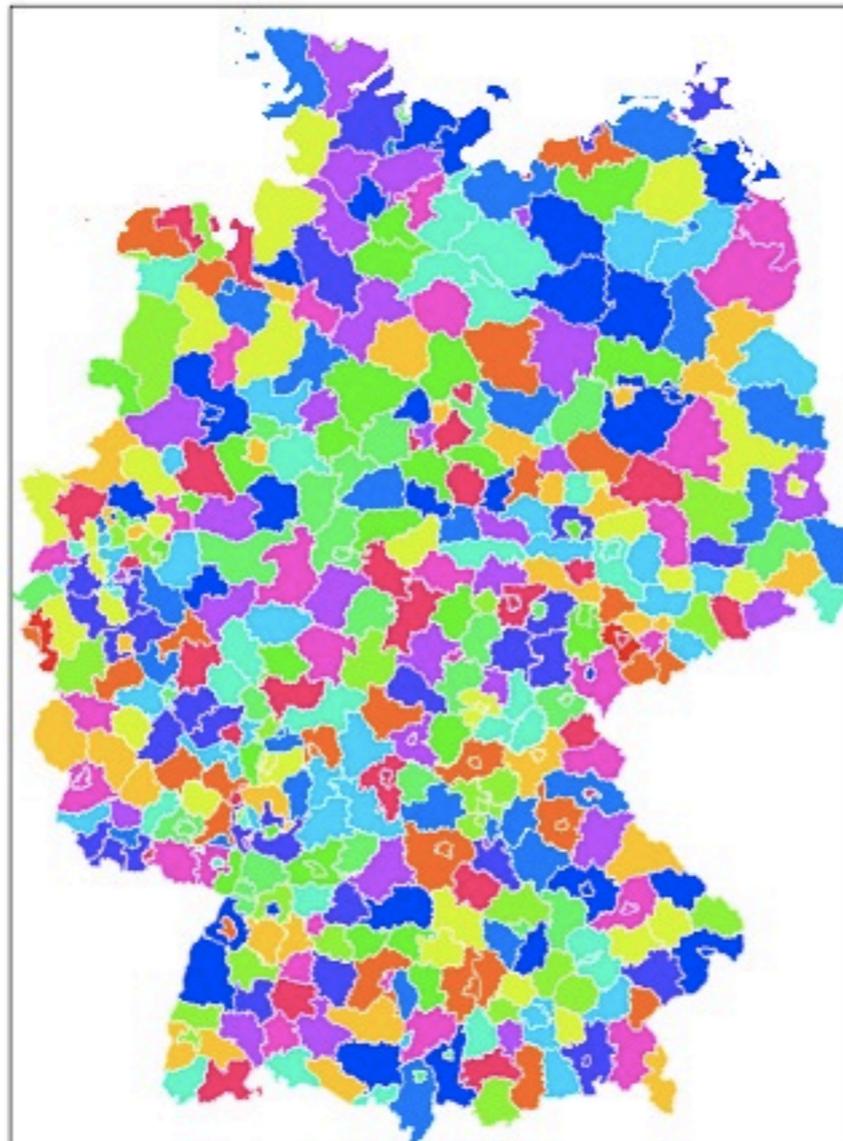
Cerebral Mastication

Learn R

Formative Assessment

```
close(con)
# plot Germany with random colors
col = rainbow(length(levels(gadm$NAME_3)))
spplot(gadm, "NAME_3", col.regions=col, main="German Regions",
        colorkey = FALSE, lwd=.4, col="white")
#####
```

German Regions



This looks nice. To produce a color vector to visualize the unemployment rate the

Philippe Zimbardo zu seinem neuen
Buch September 29, 2009
markheckmann
Personal Construct Psychology
Konferenz 2009 in Venedig July 28,
2009 markheckmann
user! Konferenz in Rennes 2009 July
15, 2009 markheckmann

r-help latest postings

Patch for legend.position=
{left,top,bottom} in ggplot2
open files from ftp site
raw data form .CEL file
fit data with $y = x^{-1}$
Polar coordinate

recent comments

nattomi on Playing with the
'playwith' package
lago on Playing with the
'playwith' package
markheckmann on R: Monitoring the
function progress with a progress bar

mark on twitter

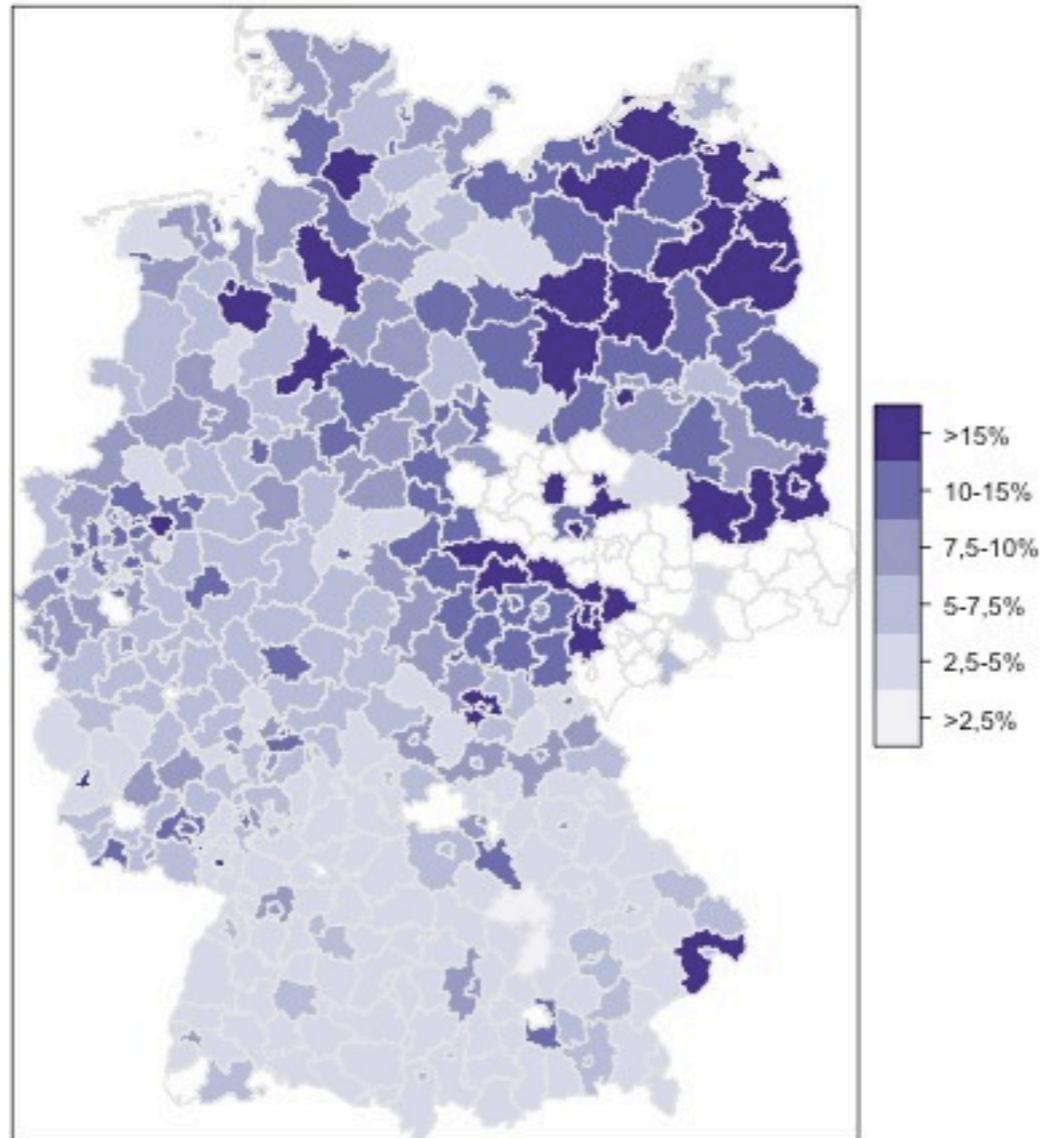
RT @Piesi: Most useless machine: :D
<http://bit.ly/caxgm7> 3 weeks ago
Repertory grid Seminar bei EAC in
Leipzig. Multtgrid hauthanh. Nette
Leute, interessante Inhalte. #repgrid
4 months ago
hi, does someone know a
#twitterwall provider on which
tweets are displayed anonymously?
4 months ago
Uuf. der 3 Tage Codesprint beim
#EduHack ist vorbei.Eine tolle Sache,

Formative Assessment

```
# plotting  
spplot(gadm, "col_no", col=grey(.9), col.regions=myPalette,  
main="Unemployment in Germany by district")
```

```
#####
```

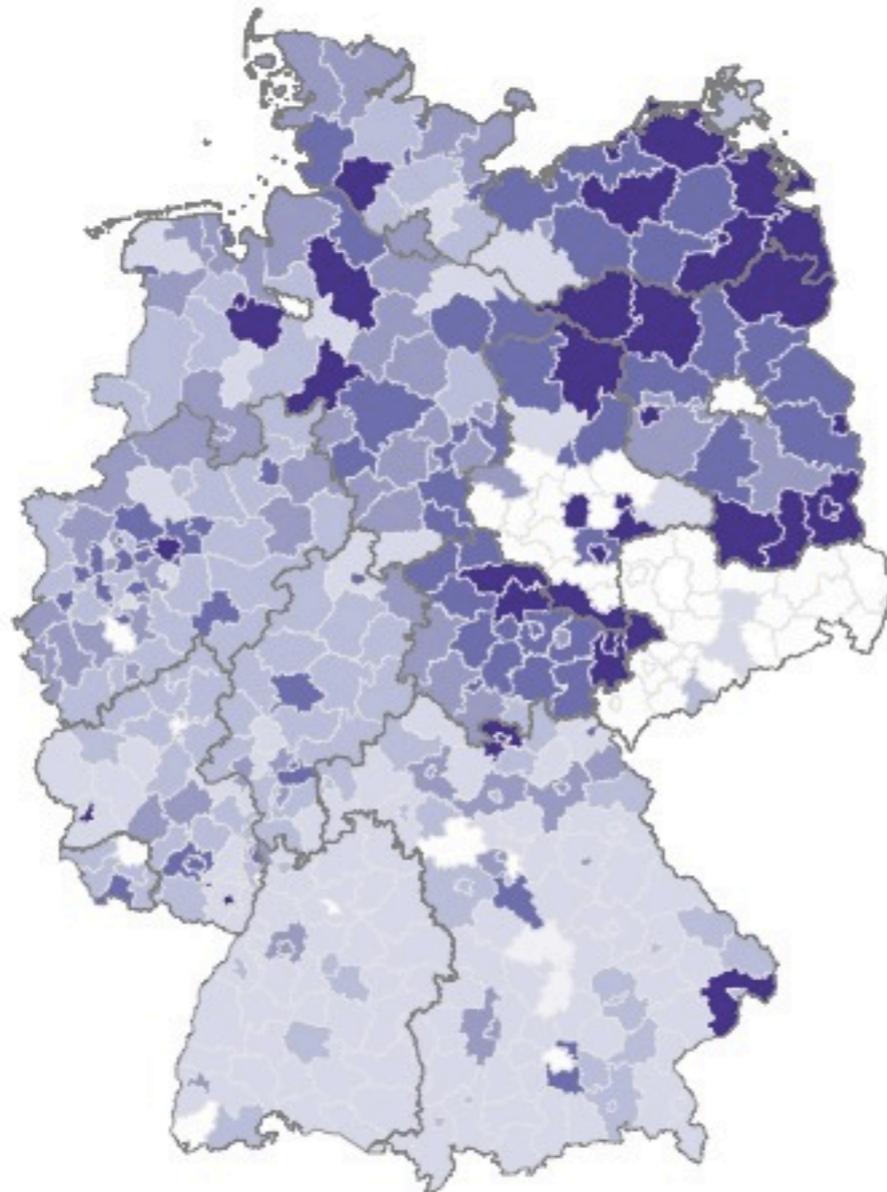
Unemployment in Germany by district



Formative Assessment

```
# col_no comes from the calculations above
par(mar=c(0,0,0,0))
plot(nc3, col=myPalette[col_no], border=grey(.9), lwd=.5)
plot(nc1, col=NA, border=grey(.5), lwd=1, add=TRUE)
```

```
#####
```



Formative Assessment

4 **Gaël Laurans** on November 24, 2009 said:

Hi Mark,

I had another look at the problem and I think “agrep” isn’t really useful for that. You need to allow for a big distance to find matches for some districts and then you have many matches for other districts. Worse, the results are not ordered by distance and taking the first one just doesn’t work. It could be possible to get around this problem by rolling out your own fuzzy matching function but it seems like a lot of trouble, especially if you want to make it reasonably fast.

In fact, a few calls to the regular “grep” can do the job as well, using gadm’s VARNAME and TYPE fields.

```
landkreise <- as.data.frame(cbind(unlist(gadm@data$NAME_3),
unlist(gadm@data$VARNAME_3)))
names(landkreise) <- c("OName","VName")
landkreise$OName[landkreise$OName == "NA"] <- NA
landkreise$OName <- gsub(" Städte","",landkreise$OName)
landkreise$VName[landkreise$VName == "NA"] <- NA
landkreise$FName <- paste(landkreise$OName, ", ", gsub("Städte", "Stadt",
gsub("Landkreise", "Landkreis", unlist(gadm@data$TYPE_3))), sep="")

order1 <- as.vector(unlist(lapply(sapply(landkreise$FName, grep,
unempl$Landkreis, value=F),function(x) x[1])))
order2 <- as.vector(unlist(lapply(sapply(landkreise$OName, grep,
unempl$Landkreis, value=F),function(x) x[1])))
order3 <- as.vector(unlist(lapply(sapply(landkreise$VName, grep,
unempl$Landkreis, value=F),function(x) x[1])))

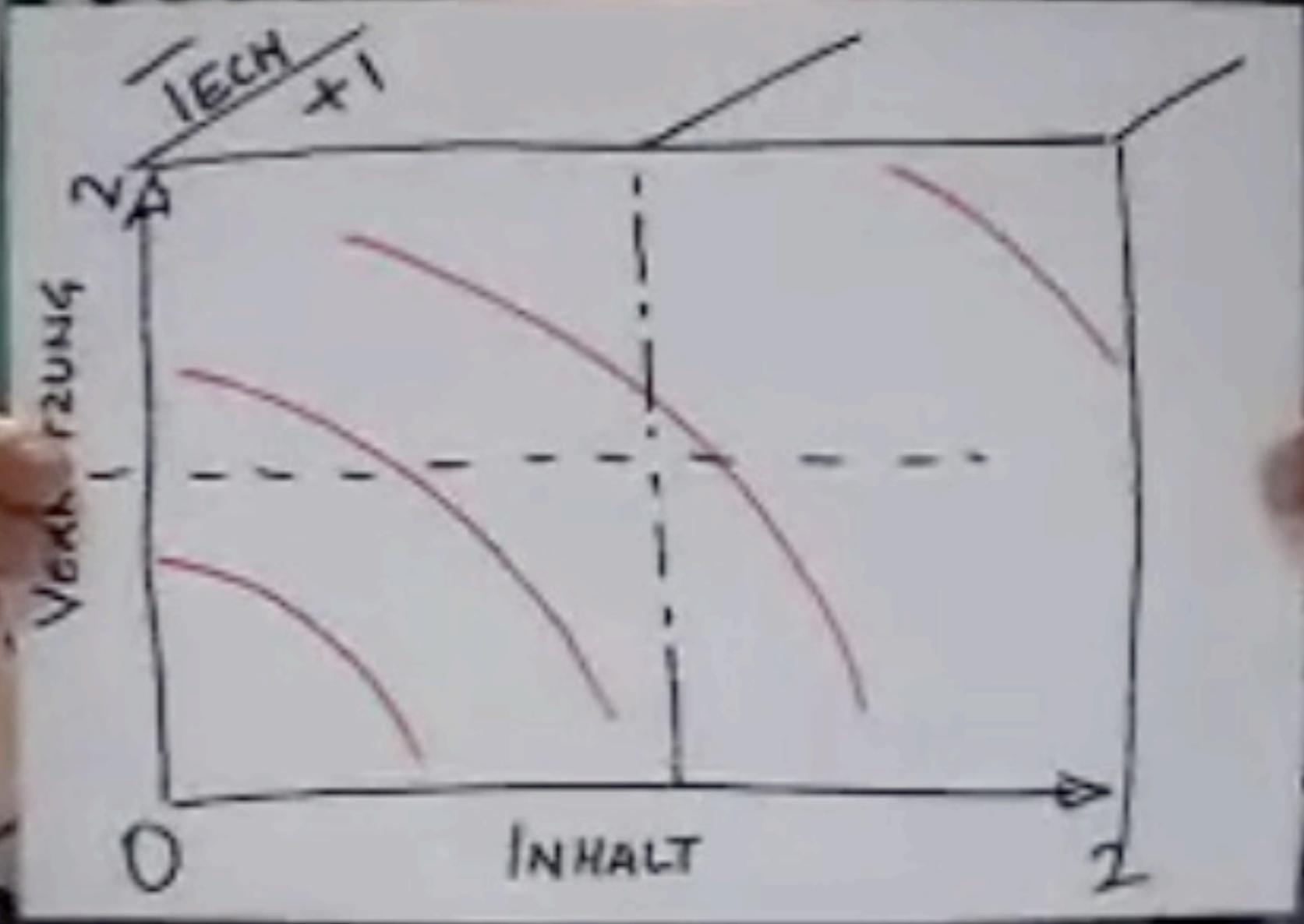
# Order is important to deal properly with districts sharing the name of a city
order <- ifelse(is.na(order1),ifelse(is.na(order3),order2,order3),order1)
```

There are still about 45 unmatched districts but Saxony is empty as it should be,

Rückmeldebogen (rubric)

	A 1 <i>Erzeugen & Evaluieren</i>	B 2 <i>Analysieren</i>	C 3 <i>Anwenden</i>	D 4 <i>Verstehen (& Erinnern)</i>	E 5 <i>Mängel in V (& E)</i>
Kriterium 1 <i>Kompetenz 1</i> <i>(30%)</i>	Operationalisierung auf höchstem Niveau	Operationalisierung auf hohem Niveau	Operationalisierung auf mittlerem Niveau	Operationalisierung auf niedrigem Niveau	Operationalisierung auf mangelhaften Niveau
Kriterium 2 <i>Kompetenz 2</i> <i>(50%)</i>	Operationalisierung auf höchstem Niveau	Operationalisierung auf hohem Niveau	Operationalisierung auf mittlerem Niveau	Operationalisierung auf niedrigem Niveau	Operationalisierung auf mangelhaften Niveau
Kriterium 3 <i>Kompetenz 3</i> <i>(20%)</i>	Operationalisierung auf höchstem Niveau	Operationalisierung auf hohem Niveau	Operationalisierung auf mittlerem Niveau	Operationalisierung auf niedrigem Niveau	Operationalisierung auf mangelhaften Niveau

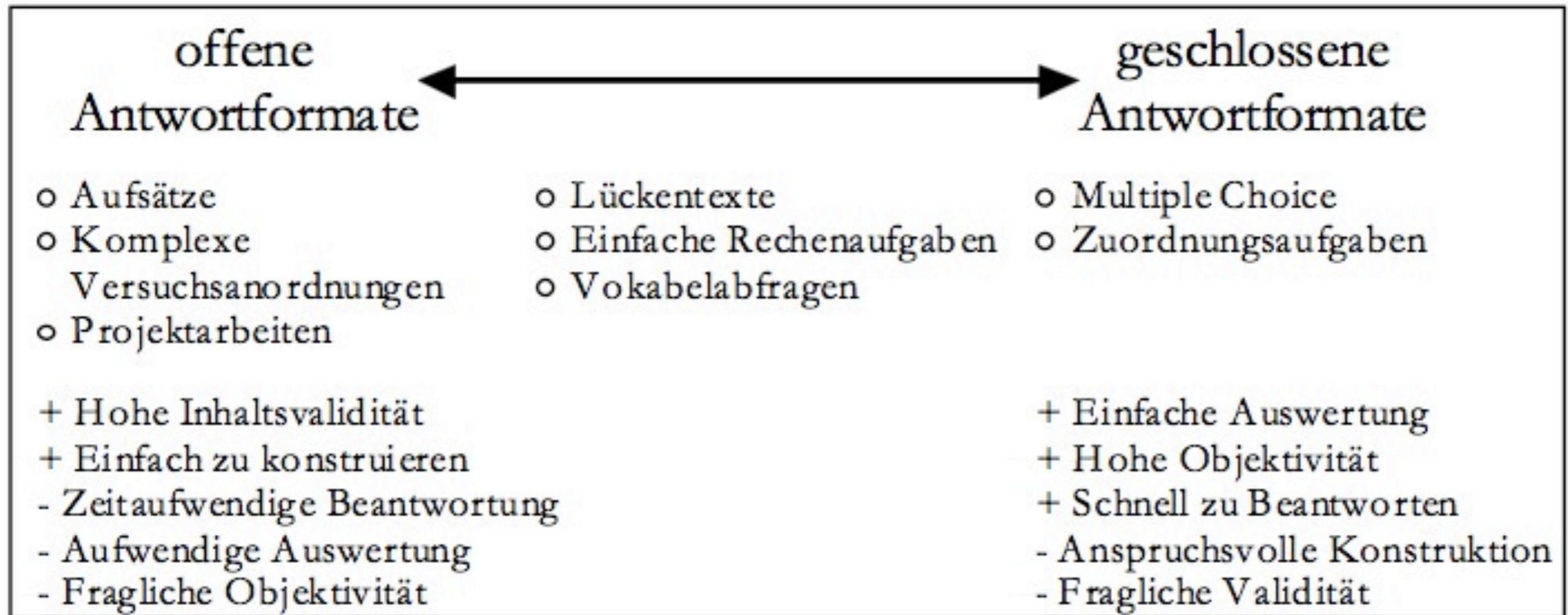
K.O.



Was ist neu bei E-Klausuren

- **Zeitlicher** Vorlauf und **organisatorisch-technischer** Aufwand
- **Technische Unterstützung** bei **Auswertung**
- ggf. **neue Itemformate** (z.B. Multimedia)
- ggf. ungewohnte Itemformate (z.B. vom Freitext zum **Multiple Choice**)
- **Veränderungsprozess**
 - ggf. **Qualitätsprobleme**
 - **erneutes Nachdenken** über Qualität von Klausuren & Testverfahren

„Bitte diskutieren sie die Wechselwirkung zwischen der Gestaltung von (a) summativen sowie (b) formativen Leistungstests mit den Lernanstrengungen der Lernenden.“



Quelle: Johannes Hartig & Nina Jude 2007, S.30



Projekt: Führerscheinprüfung am PC

3D-Visualisierung von Verkehrsszenen



Test Wiseness Clues bei MC-Fragen

- Die **allgemeingültigste Antwort** ist zumeist die richtige

The lungs

1. are solid and immobile and located within the chest
2. are the only organs that produce insulin
3. *function primarily in respiration*
4. possess the sphincter of Oddi

- Die **längste Antwort** kann häufig die richtige sein

One of the main reasons for Custer's defeat at the Little Big Horn was the fact that

1. *he split his troops into three groups, making each group too small to effectively fight*
2. the weather was too hot
3. he had sick horses
4. he wanted to be president

Test Wiseness Clues bei MC-Fragen

- Die richtige Antwort bei Zahlenwerten ist meistens der mittlere Wert
The mature human being has how many teeth?
 1. 15
 2. 32
 3. 54
 4. 7
- Wenn zwei Alternativen die gleiche Bedeutung haben, sind beide falsch
The treaty of Brest Litovsk was ratified by Moscow because
 1. Tzar Alexander I wanted to prevent Napoleon's invasion of Russia.
 - 2. Russia was unable to keep up with the armament manufacture of Austria**
 - 3. Russia could not keep pace with the military production of Austria**
 4. *Nicolai Lenin wanted to get the Soviet Union out of WWI*

Test Wiseness Clues bei MC-Fragen

- Wenn zwei Alternativen das Gegenteil besagen, wähle eine davon
The planarian has
 - 1.*an anterior brain*
 - 2.three legs
 - 3.red eyes
 - 4.a posterior *brain*
- Auf grammatikalische Fehler zwischen Fragenteil und Antwort achten
Important in feeling pain are
 - 1.bone
 - 2.ear
 - 3.muscle
 - 4.nerves

Test Wiseness Clues bei MC-Fragen

- Auf Wortwiederholungen zwischen Frage und Antwort achten
The *Strong Vocational Interest Blank* is used to measure
 1. aptitudes
 2. *interest*
 3. achievement
 4. adjustment
- Länge der „Fill-in-the-blanks“ berücksichtigen
A popular song during World War I was _____
 1. Over the Hill
 2. *Over there*
 3. Why the Kaiser
 4. Adolph

Test Wiseness Clues bei True-False-Fragen

- Bestimmte Wörter machen eine Antwort mit hoher Wahrscheinlichkeit falsch oder richtig

Falsch

- Immer, Niemals, Nur, Notwendigerweise, Muss, Alle, Keine, Unmöglich, Ausnahmslos

Könnte richtig oder falsch sein

- Oft, Selten, Vielleicht, Manchmal, Gewöhnlich, kann, normalerweise

Beispiele

It is **always** sunny during winter at LaCrosse

July is always a summer month

The compensation of a skilled workperson often exceeds that of a laborer

Operas are invariably sung in Italian

Insurances sometimes serves as protection against income interruption

Test Wiseness **Cheat Sheet**

- Categorical Exclusive -> false
- Phrase-Repeat -> true
- Absurd/Implausible Answer -> false
- Precision/Specificity -> true
- Length -> longer = true
- Grammar -> mistakes = false
- Give-Away -> right answer found in other question's stem
- Order of answer -> no answer pattern
- Odd man out -> the different answer to other very similar ones is true
- Spelling -> mistakes more often occur in distractors

Test Wiseness Test

The answer of this one refers to an

- (a) overture
- (b) mountain
- (c) building
- (d) misnomer

<http://www.kvhigh.com/learning/testtips.html>

Test Wiseness Test: Grammatikalischer Hinweis

The answer of this one refers to an

- (a) an **overture**
- (b) a mountain
- (c) a building
- (d) a misnomer

<http://www.kvhigh.com/learning/testtips.html>

Test Wiseness Test

In which pifflerock did zorkrans inkle?

- (a) gi hien
- (b) gis inkle
- (c) gish frankel
- (d) gishen fronk

<http://www.kvhigh.com/learning/testtips.html>

Test Wiseness Test: Wiederholung aus Wortstamm

In which pifflerock did zorkrans inkle?

- (a) gi hien
- (b) gis **inkle**
- (c) gish frankel
- (d) gishen fronk

<http://www.kvhigh.com/learning/testtips.html>

Test Wiseness Test

If there were a question here,
which could be the correct answer?

- (a) besiegt
- (b) siegreich
- (c) niedergeschlagen
- (d) unterworfen

<http://www.kvhigh.com/learning/testtips.html>

Test Wiseness Test: odd one out

Wenn hier eine Frage stände,
was wäre die richtige Antwort?

- (a) besiegt
- (b) **siegreich**
- (c) niedergeschlagen
- (d) unterworfen

<http://www.kvhigh.com/learning/testtips.html>

Test Wiseness Test

Hixek norfolken piffle?

(a) Hiku nippon ibitus

(b) Efil Yadlan Ruoj

(c) Yokon Gnithol

(d) Ikkek zippo unkerzotz notiaplan

hippolslumg enslife yolent

<http://www.kvhigh.com/learning/testtips.html>

Test Wiseness Test: Längste Alternative

Hixek norfolken piffle?

(a) Hiku nippon ibitus

(b) Efil Yadlan Ruoj

(c) Yokon Gnithol

(d) **Ikkek zippo unkerzotz notiaplan
hippolslumpg enslife yolent**

<http://www.kvhigh.com/learning/testtips.html>

Test Wiseness Test

Dome ukerland dimmel?

- (a) Nepal
- (b) Canada
- (c) Britain
- (d) United States

<http://www.kvhigh.com/learning/testtips.html>

Test Wiseness Test: Odd out

Dome ukerland dimmel?

- (a) **Nepal**
- (b) Canada
- (c) Britain
- (d) United States

Test Wiseness Test

Zarfarkle, en Ko day?

- (a) Henkledorf
- (b) Ricktoffen
- (c) Ifetaim
- (d) Krator

<http://www.kvhigh.com/learning/testtips.html>

Test Wiseness Test: ~~Alternative 3~~

Zarfarkle, en Ko day?

- (a) Henkledorf
- (b) Ricktoffen
- (3) Ifetain**
- (d) Krator

<http://www.kvhigh.com/learning/testtips.html>

Test Wiseness Test

Die richtige Antwort ist?

- (a) Parrallele
- (b) Absisse
- (c) Koordinate
- (d) Tangennte

Test Wiseness Test: Rechtschreibung

Die richtige Antwort ist?

- (a) Parrallele
- (b) Absisse
- (c) **Koordinate**
- (d) Tangennte

Fragetypen am Testcenter der Universität Bremen

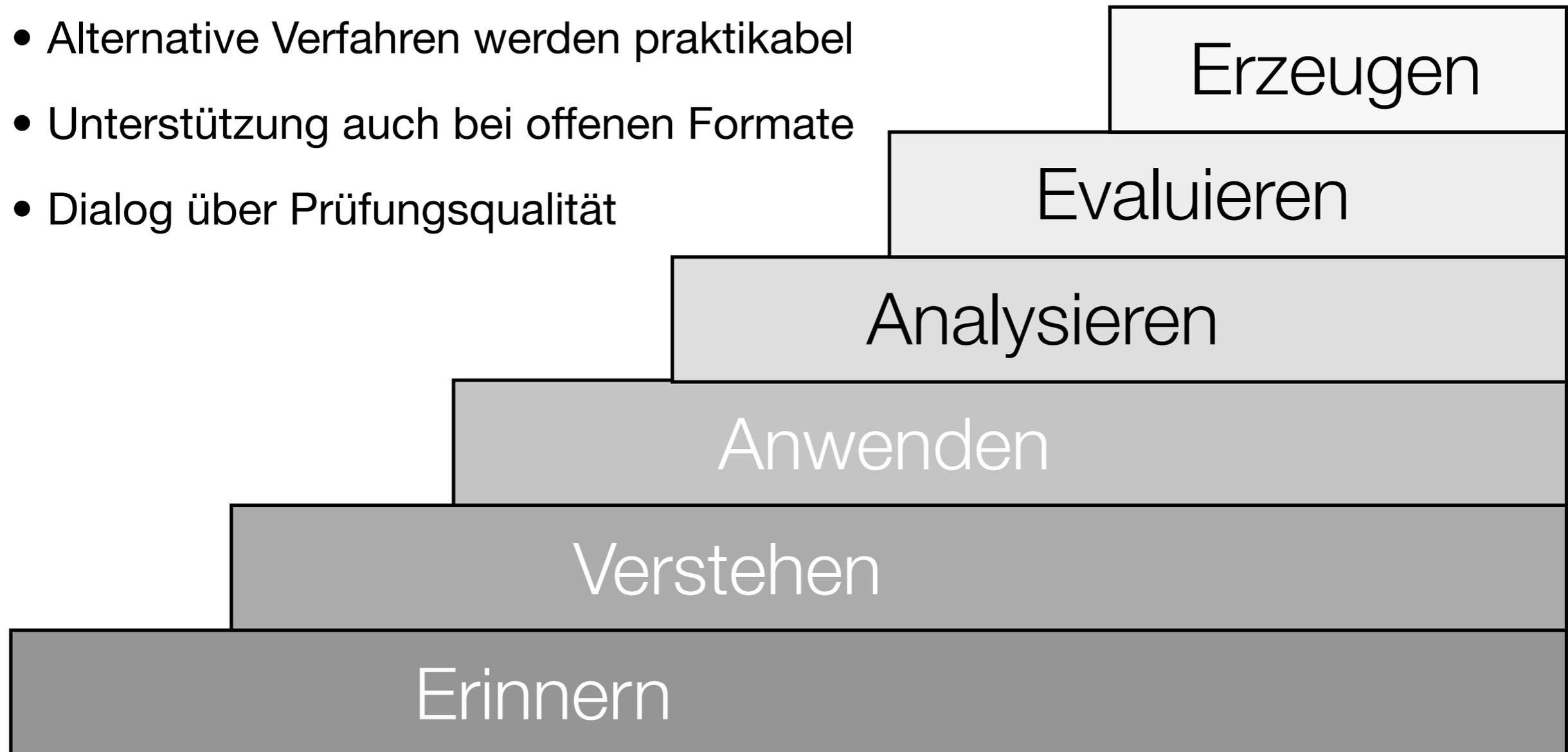
Fragetypen

Freitextfragen	offen	freie Eingabe
Eingabe Zahlen / Texte	geschlossen (automatische Bewertung)	
Positionieren		Antwort-Wahl-Verfahren
Zuordnen / Sortieren (Texte, Graphiken)		
Antwortpaare (z.B. Ja/Nein)		
Multiple Choice		
Single Choice		

Ausgangsfrage:

E-Assessments können auf allen Taxonomiestufen eingesetzt werden

- Formative Bewertungsverfahren
- Alternative Verfahren werden praktikabel
- Unterstützung auch bei offenen Formate
- Dialog über Prüfungsqualität



MCQs für Bloom?

- L1: Erinnern

Welche der folgenden Personen ist der Autor von „Das Kapital“
Mannheim / Marx / Weber / Engels / Michels

Welche der folgenden Definitionen zu ... ist richtig?

Welche der folgenden Sequenzen ist richtig?

- L2: Verstehen

Welche der folgenden Antworten beschreibt die VORBEREITUNGS-Phase eines kreativen Prozesses zur Lösung eines bestimmten Problems?
... / ... / ... / All available information about the problem is collected

Erinnern + Verstehen

MCQs für Bloom

- L3: Anwenden

Welches der folgenden Werte stimmt am ehesten mit dem Volumen einer Kugel mit einem Radius von 5 Metern überein?

2000 kubikmeter / 1000 / 500 / 250

aber auch Entscheidungssituationen in kleinen Fällen oder leichte Transfer-Aufgaben

Example C2.3.3

You are the sole owner and manager of a small enterprise employing 15 workers. One of these, Alfred, (who has been working for you for the past year and has somewhat of a history of absenteeism), arrives late for work one Wednesday morning, noticeably intoxicated. Which one of the following actions is the most appropriate in the circumstances?

1. You terminate Alfred's employment on the spot, paying him the wages still due to him.
2. You parade Alfred in front of the other workers, to teach them all a lesson.
3. You give Alfred three weeks' wages in lieu of notice, and sack him.
4. You wait until Alfred is sober, discuss his problem, and give him a final written warning, should it be required.
5. You call Alfred's wife to take him home and warn her that this must not happen again.

MCQs für Bloom

- L4: Analyse

Example C2.4.1

"The story is told of the famous German Organic Chemist Auguste Kékulé who was struggling with the problem of how the six carbon atoms of benzene were linked together. He was getting nowhere with the problem, and one day fell asleep in front of the fireplace while he was pondering on it. He dreamt of molecules twisting and turning around like snakes. Suddenly, one of the snakes swallowed its own tail and rolled around like a hoop. Kékulé woke up with a start, and realized that his problem could be solved if the six carbon atoms of benzene were attached to each other to form a ring. Further work showed that this was entirely correct."

The above passage illustrates a particular phase of the creative process. Which one is it?

1. preparation
2. incubation
3. orientation
4. illumination
5. verification

Example C2.4.2 (Assume the question below is asked in a philosophy test.)

Read carefully through the paragraph below, and decide which of the options 1-5 is correct.

"The basic premise of pragmatism is that questions posed by speculative metaphysical propositions can often be answered by determining what the practical consequences of the acceptance of a particular metaphysical proposition are in this life. Practical consequences are taken as the criterion for assessing the relevance of all statements or ideas about truth, norm and hope."

1. The word "acceptance" should be replaced by "rejection".
2. The word "often" should be replaced by "only".
3. The word "speculative" should be replaced by "hypothetical".
4. The word "criterion" should be replaced by "measure".

MCQs für Bloom

- L6: Evaluation

Example C2.5.1

A student was asked the following question: "Briefly list and explain the various stages of the creative process".

As an answer, this student wrote the following:

"The creative process is believed to take place in five stages, in the following order: ORIENTATION, when the problem must be identified and defined, PREPARATION, when all the possible information about the problem is collected, INCUBATION, when there is a period where no solution seems in sight and the person is often busy with other tasks, ILLUMINATION, when the person experiences a general idea of how to arrive at a solution to the problem, and finally VERIFICATION, when the person determines whether the solution is the right one for the problem."

How would you judge this student' s answer?

1. EXCELLENT (all stages correct in the right order with clear and correct explanations)
2. GOOD (all stages correct in the right order, but the explanations are not as clear as they should be).
3. MEDIOCRE (one or two stages are missing OR the stages are in the wrong order, OR the explanations are not clear OR the explanations are irrelevant)
4. UNACCEPTABLE (more than two stages are missing AND the order is incorrect AND the explanations are not clear AND/OR they are irrelevant)

Innovationsbereiche bei MC-Formaten

- **Übersaturierung** der Antwortmöglichkeiten
 - 300 Medikamente
 - 250 Philosophen
- **Confidence Based** Marking
 - zusätzlich angeben, wie sicher man sich ist
 - höhere Positiv- wie Negativ-Punkte
 - Effekt: tiefergehende Lernstrategien
 - Emulation: jeweils 3 Punkte für richtig / falsch / leer kein Punkt
- **Modified Essay Question**
 - Fallbeschreibung mit sequentiell weiterführenden Fragen
 - systematische Vertiefung

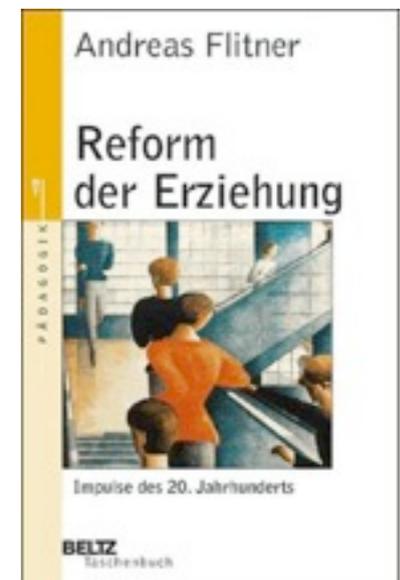
Innovationsbereiche beim E-Assessment

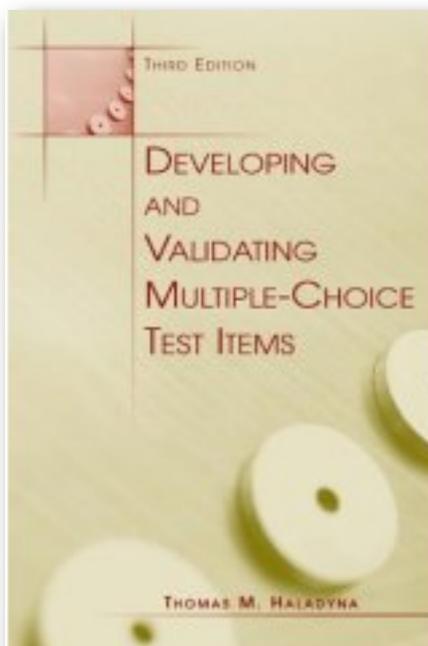
- **Simulation**
 - Realitätsnähe
 - Feedbackkomponenten
 - Explorationsmöglichkeiten
- Automatisierte Bewertung von **Essays**
- Data Mining der **Lösungsprozesse** von Experten zur Erstellung von K.modellen / -profilen.
- **Autorenwerkzeuge** für fachspezifische Tests/Sims
- Einbindung in **E-Portfolios**
- Kompetenzmessung in **Gruppen**

Die pädagogische **Chance**

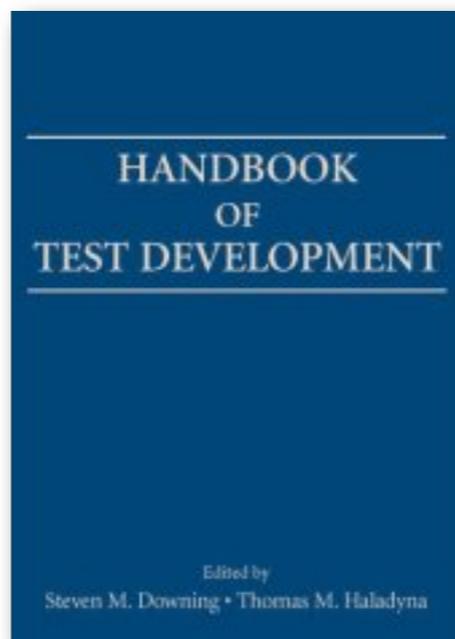
“die Leistungsbewertung für die pädagogische Aufgabe (...) zurückgewinnen und in den Prozess des Lernens, des Korrigierens, und des Beratens einzubinden.”

(Andreas Flitner 1999, S. 244)

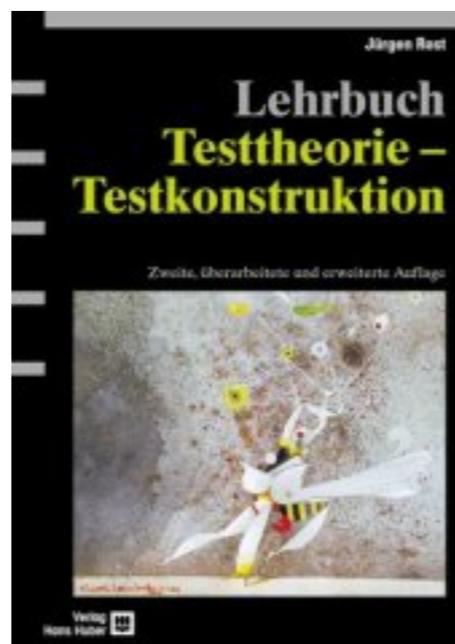




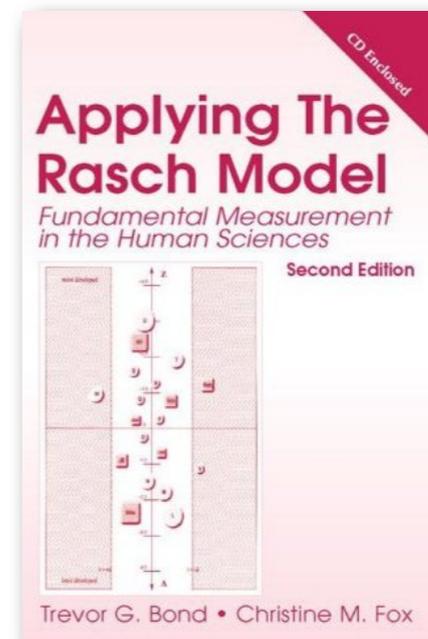
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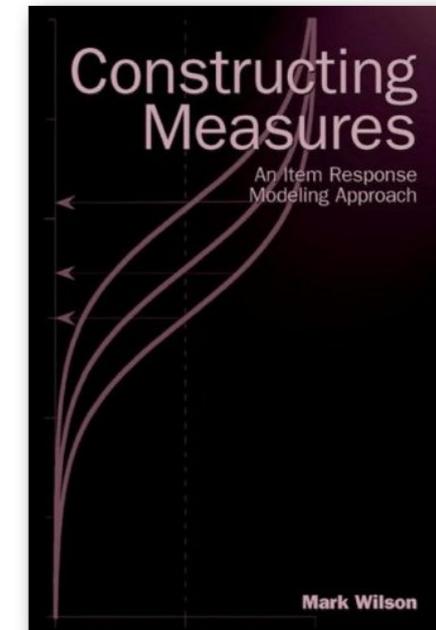


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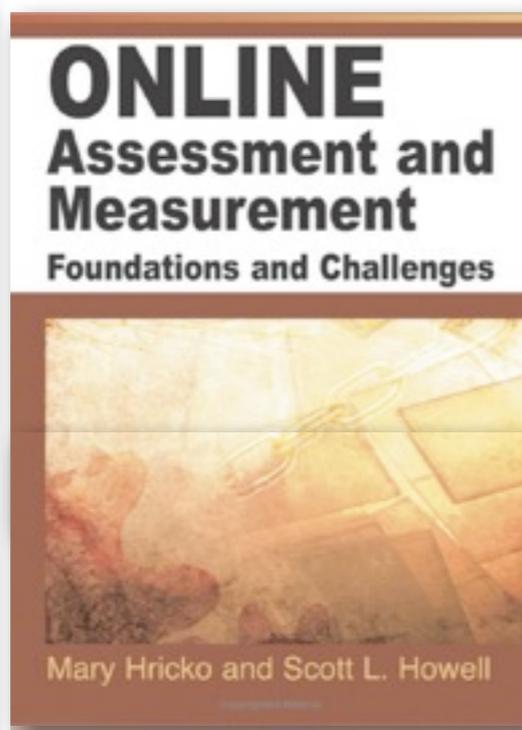


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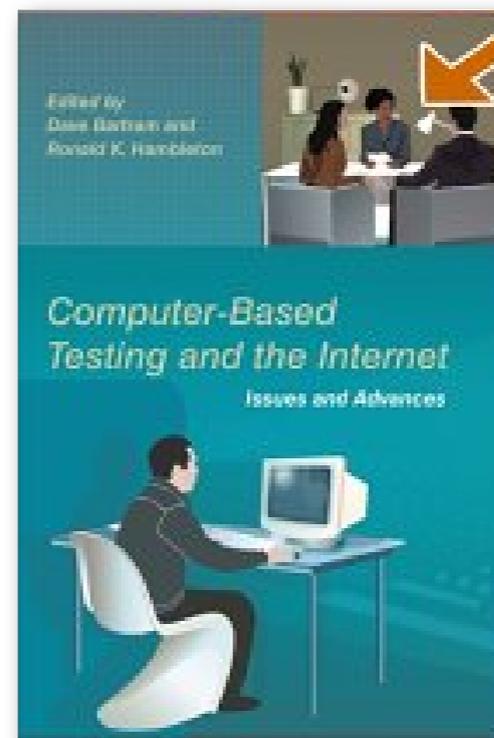
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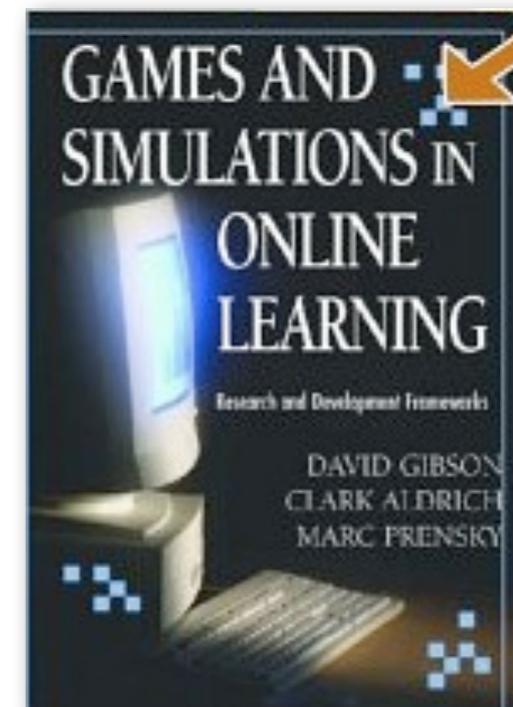
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