

Teacher Education and Development Study (TEDS-M) 4 years later: TEDS-M Follow-Up (TEDS-FU) Modeling competencies in higher education (KoKoHs)

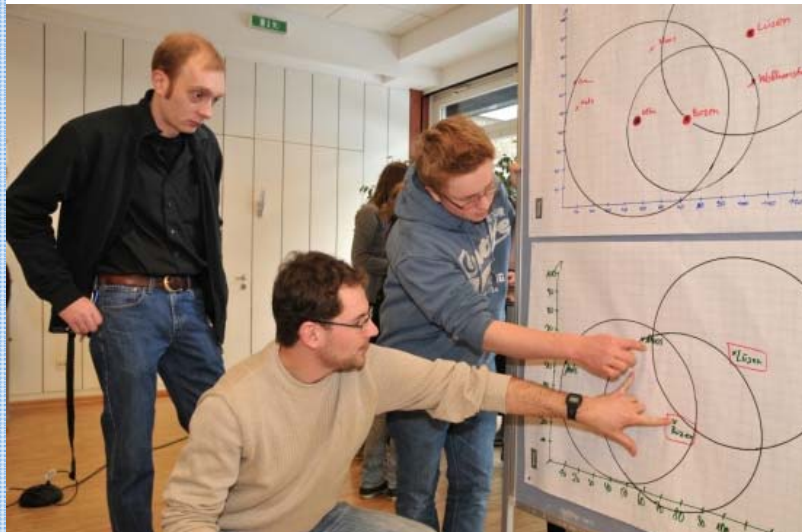


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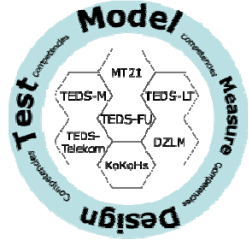
Modeling teachers' professional competence as a multi-dimensional construct



© Photos: Thomas Raupach



Sigrid Blömeke



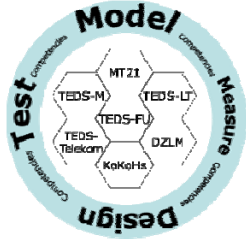
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Table of content

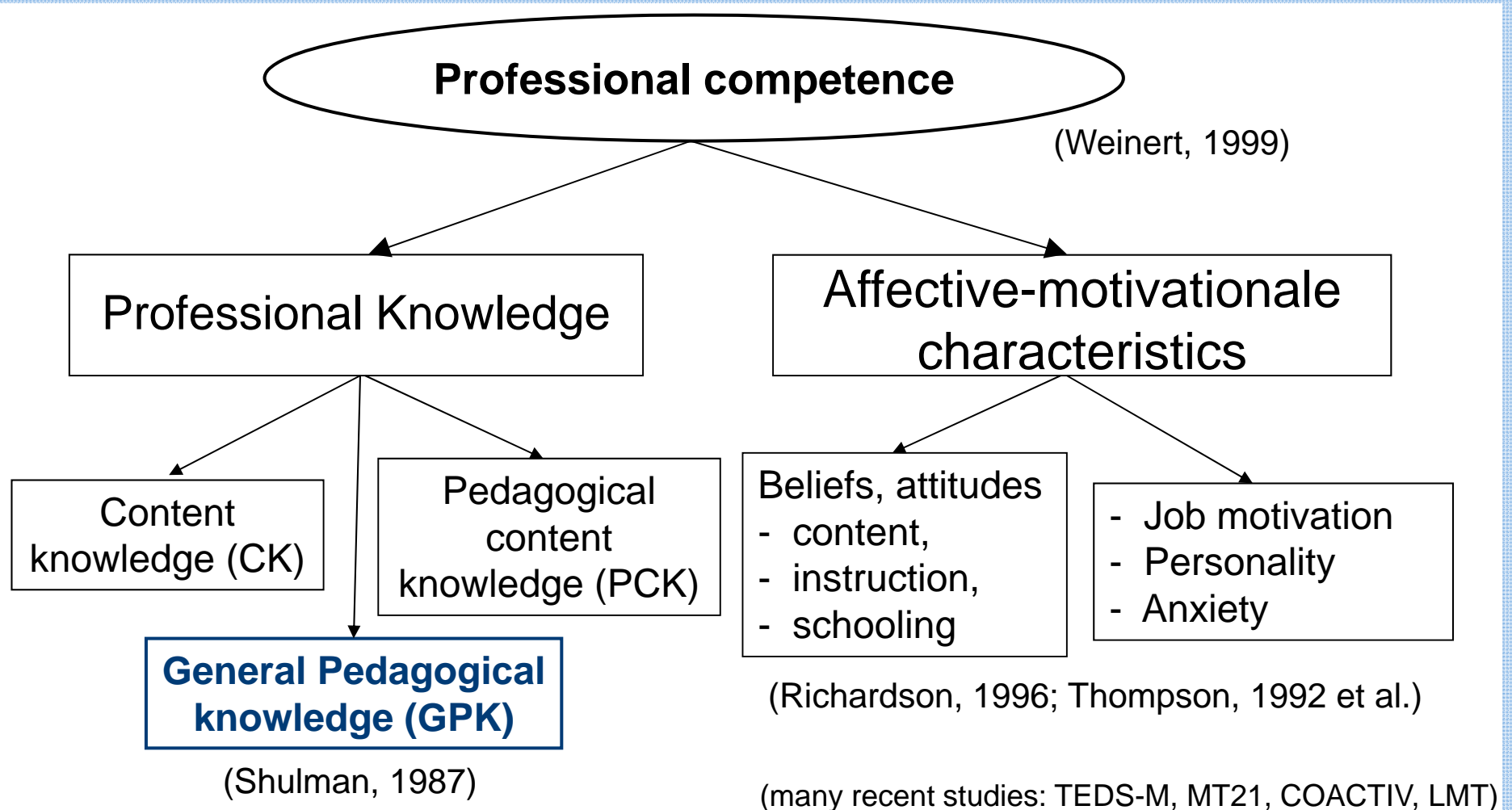
- 1) Pedagogical knowledge as a facet of teachers' professional competence
- 2) Three major challenges of pedagogical knowledge assessments:
 - a) validity with respect to classroom performance
 - b) validity with respect to student achievement
 - c) validity across countries with different cultural backgrounds
- 3) Suggestions for OECD's ITEL project

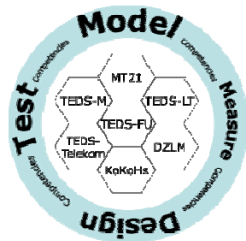


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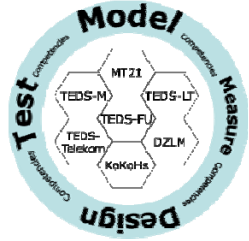
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GPK dimensions	Covered by the TEDS-M 2008 test
Structuring lessons/ lesson planning	<ul style="list-style-type: none"> - components of lesson planning and lesson process - lesson evaluation - structuring of learning goals
Motivating students/ Classroom management	<ul style="list-style-type: none"> - achievement motivation - strategies to motivate single students / the whole group - strategies to prevent and counteract interferences - effective use of allocated time / routines
Adaptivity	<ul style="list-style-type: none"> - strategies of differentiation - variety and use of teaching methods
Diagnosing student achievement	<ul style="list-style-type: none"> - assessment types and functions - central criteria - teacher expectation effects

König, J., Blömeke, S., Paine, L., Schmidt, W. H. & Hsieh, F.-J. (2011). General Pedagogical Knowledge of Future Middle School Teachers: On the Complex Ecology of Teacher Education in the United States, Germany, and Taiwan. *Journal of Teacher Education*, 62(2), 188-201.



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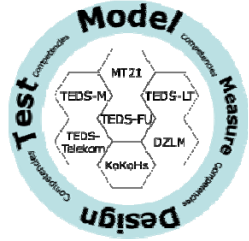


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TEDS-M 2008		Cognitive processes involved		
		recalling	understanding/ analyzing	Creating/ generating
GPK dimensions	structuring			
	motivation/ management			
	adaptivity			
	diagnosing			

85 dichotomous and partial-credit items (MC, CR and OR) assessing elementary teachers' GPK, 77 items assessing middle school teachers' GPK
=> Validity confirmed in Germany, Taiwan, U.S.

(König, J., Blömeke, S., Paine, L., Schmidt, W. H. & Hsieh, F.-J. (2011). General Pedagogical Knowledge of Future Middle School Teachers: On the Complex Ecology of Teacher Education in the United States, Germany, and Taiwan. *Journal of Teacher Education*, 62(2),188-201.)



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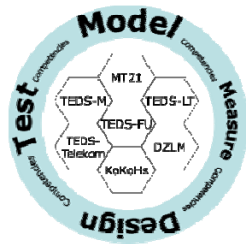
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Imagine you are helping a future teacher to evaluate her lesson because she has never done this before. To help her adequately analyze her lesson, what question would you ask? Formulate ten essential questions and write them down.

- 1) *Do your students have prior knowledge about the subject?*
- 2) *What are your objectives?*
- 3) *Are the students working individually or in groups?*
- ...
- 10) *Have your students gained the knowledge from the lesson?*

(genuine response from the U.S. TEDS-M study of middle school teachers)

König, J., Blömeke, S., Paine, L., Schmidt, W. H. & Hsieh, F.-J. (2011). General Pedagogical Knowledge of Future Middle School Teachers: On the Complex Ecology of Teacher Education in the United States, Germany, and Taiwan. *Journal of Teacher Education*, 62(2), 188-201.



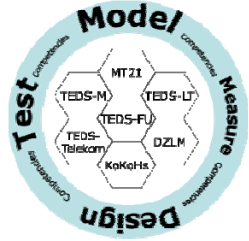
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Elementary	M	SE	SD
Germany	601	3,7	95
international	500	0,7	100
USA	462	2,7	72
Middle School	M	SE	SD
Germany	576	4,9	85
Taiwan	572	3,2	52
International	500	2,2	100
USA** 1 3	440	3,0	66

König, J., Blömeke, S., Paine, L., Schmidt, W. H. & Hsieh, F.-J. (2011). General Pedagogical Knowledge of Future Middle School Teachers: On the Complex Ecology of Teacher Education in the United States, Germany, and Taiwan. *Journal of Teacher Education*, 62(2),188-201.



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GPK as a facet of teachers' professional competence

What has been accomplished?

Reliable assessment of an important cognitive resource

Analytical approach allows precise diagnostics of strength and weakness

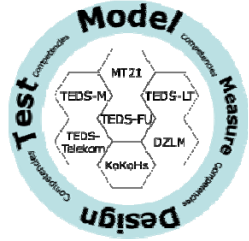
Feasible option of competence assessment

Limits of GPK test

Low face validity resulting in large proportions of non-response and missings

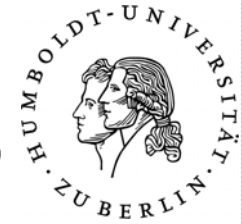
Gap with respect to transformation into classroom performance

Gap with respect to student achievement because it is domain-specific



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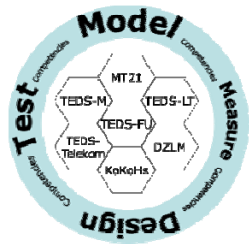
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Improving the validity with respect to classroom performance

- Blömeke, Gustafsson and Shavelson developed the
»P-I-D model of competence»
- Perception, Interpretation and Decision-making represent
situation-specific skills
- P-I-D mediate the effects of teacher knowledge on their performance
- P-I-D bridge between knowledge as a disposition (or *trait*) and
observable classroom performance as a context-related teacher
characteristic (or *state*)

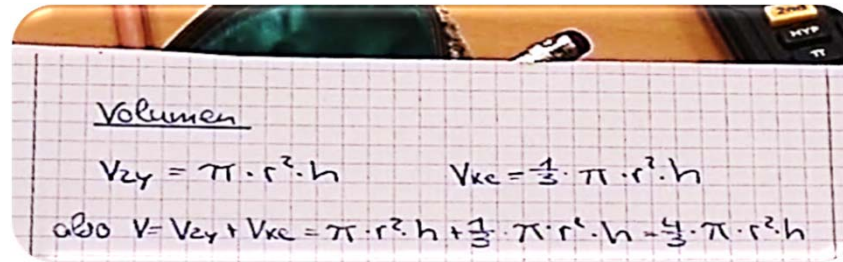
(Blömeke, S., Gustafsson, J.-E. & Shavelson, R. (in press). Beyond dichotomies:
Viewing competence as a continuum. *Zeitschrift fuer Psychologie*.



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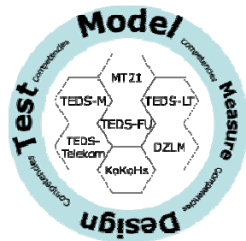


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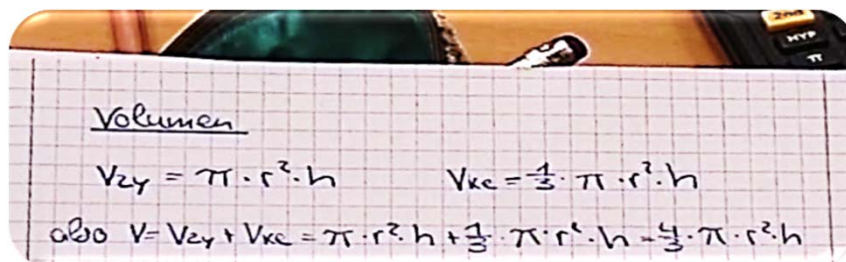
Blömeke, S., Busse, A., Suhl, U., Kaiser, G., Benthien, J., Döhrmann, M. & König, J. (in press).
Entwicklung von Lehrpersonen in den ersten Berufsjahren: Längsschnittliche Vorhersage von
Unterrichtswahrnehmung und Lehrerreaktionen durch Ausbildungsergebnisse.
Zeitschrift für Erziehungswissenschaft.

König, J., Blömeke, S., Klein, P., Suhl, U., Busse, A., & Kaiser, G. (2014). Is teachers' general pedagogical
knowledge a premise for noticing and interpreting classroom situations? A video-based assessment approach.
Teaching and Teacher Education, 38, 76-88.



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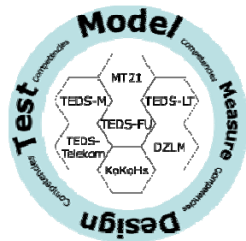


(Blömeke et al., accepted; König et al., 2014)

TEDS-FU: **Video-based assessment** of perception, interpretation and decision-making of mathematics elementary and middle school teachers:

Job requirements:

Diagnosing student achievement, explaining content, dealing with heterogeneity (critical incidents)



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	<u>Indicators of expertise</u>	<u>Novices</u>
Orientation	Long-term; sub-groups of students in mind	Short-term, whole class in mind
Lesson planning	Prior student achievement as starting point Linkage to specific long-term objectives Planning of alternatives Frequent evaluation of student achievement	Without checking preconditions Step-by-step Only one strategy Teaching methods in foreground
Classroom behavior	Smooth transfer between phases Advance organizer to connect Teacher as instructor Cognitively demanding	Phases of seatwork without teacher support Many superficial questions Complexity is reduced
Flexibility	Rich repertoire of strategies	Only few alternatives
Goal orientation	Individual understanding of students	Short-term motivation instead of achievement/ long-term interest
Perception	High accuracy, quick identification and selection of problems	Low accuracy Recall only few details

f.ex., Berliner, 1986, 2001; Chi et al., 1981, 2011; Ericsson et al., 1996; Gruber et al., 2001; Krauss, 2011; Neuweg, 1999



1



2



3

Im Video wurden drei Paare in ihrem Arbeitsprozess genauer betrachtet. Diese Arbeitsprozesse sollen im Folgenden aus zwei Perspektiven – einer (a) MATHEMATIKDIDAKTISCHEN und einer (b) PÄDAGOGISCHEN – betrachtet werden:

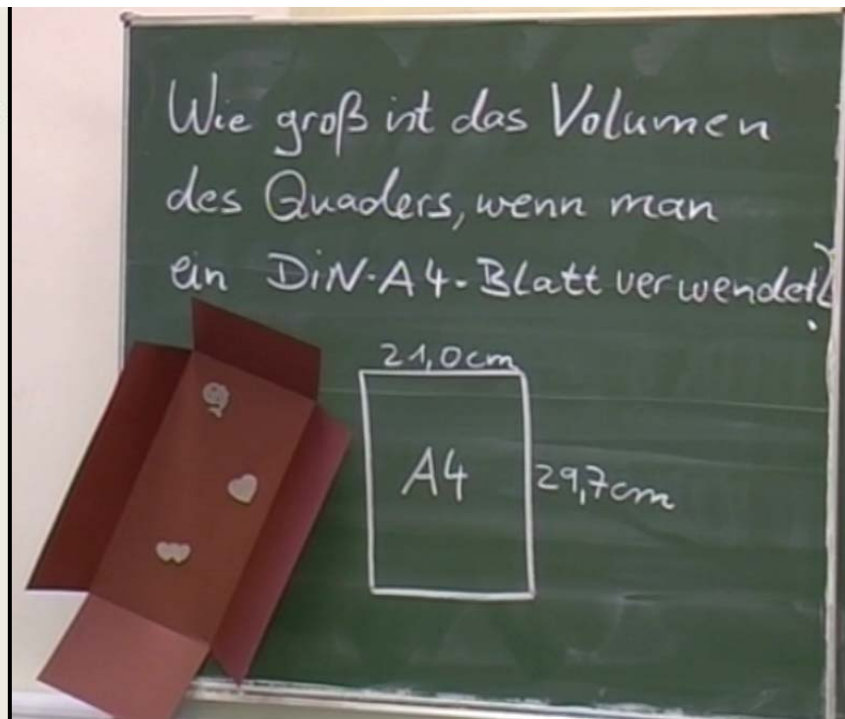
(a) MATHEMATIKDIDAKTISCHE PERSPEKTIVE

In jeder der drei gezeigten Herangehensweisen wird die Aufgabe MATHEMATISCH auf eine GANZ EIGENE ART DARGESTELLT UND BEARBEITET.

Beschreiben Sie kontrastierend die WESENTLICHEN Aspekte der Herangehensweisen aus mathematikdidaktischer Sicht (in Stichworten).

Nennen Sie dabei – falls möglich – auch die dazugehörigen Fachbegriffe.

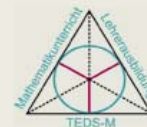
Den zweiten Teil der Aufgabe finden Sie auf der folgenden Seite.



ALLE Aussagen beziehen sich auf die im Video gezeigten Unterrichtsausschnitte. Markieren Sie zu den folgenden Aussagen jeweils den Grad Ihrer Zustimmung.

Bitte treffen Sie pro Zeile EINE Auswahl!

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Die Aufgabe enthält einige Merkmale einer offenen Aufgabenstellung.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



**18 open items +
16/22 rating scales
(M_P-I-D/P_P-I-D)**

**M_P-I-D:
WLE = .67**

**P_P-I-D:
WLE = .70**

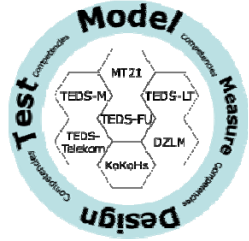
Info

zurück

weiter

(adapted from Clausen, Reusser & Klieme, 2003)

(Blömeke et al., in press;
König et al., 2014)



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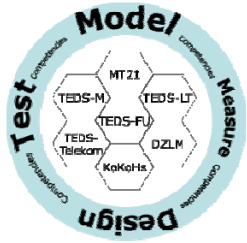
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Challenges of improving validity by video-cued testing (Kane, 1992)

- ⇒ sampling problems: situations (frequency, centrality),
rater/ experts (number, relevance), test takers = 3 „fuzzy universes“
- ⇒ evaluation problems: definition of correct–incorrect, effective–not effective
less straightforward in complex situations than in distinct MC/CR items
- ⇒ generalizability problems: across situations and towards real world given
their low number and variability (Dunekacke et al., 2013; Gold, Förster & Holodyski, 2013;
Kersting, 2008; Kersting et al., 2012; König et al., 2014; Stürmer, Könings & Seidel, 2012)

= „*reliability-validity paradoxon*“ (Brennan, 2000)

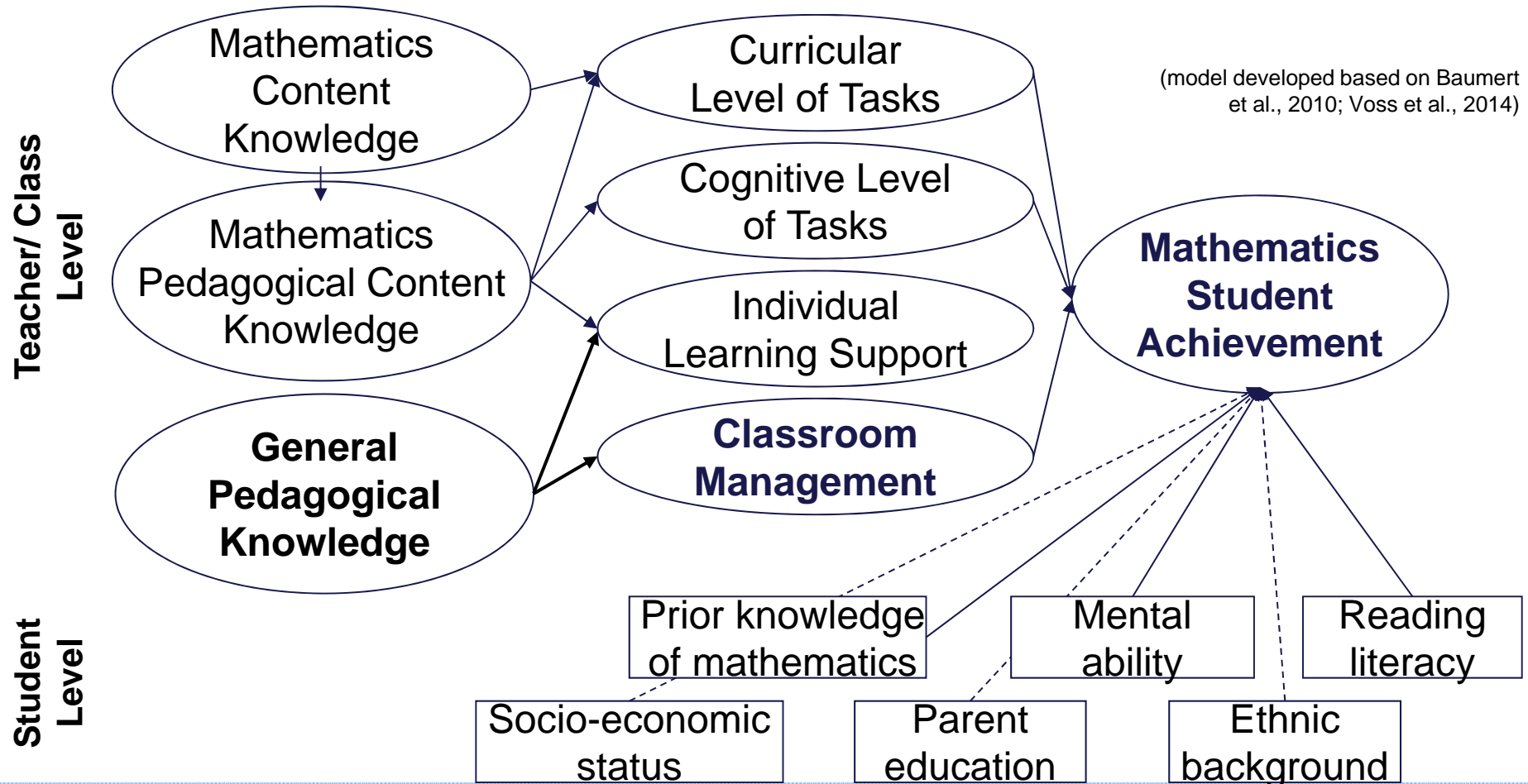


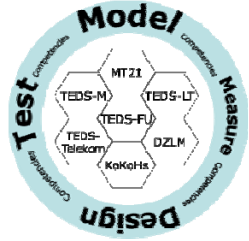
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Improving the validity with respect to student achievement





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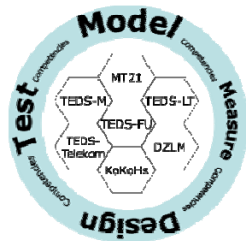
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Improving the validity with respect to student achievement

- TEDS-M tests of MCK and MPCK: international comparison of teacher education systems; assessed outcomes of tertiary education; IEA study
- Random samples of future teachers from 16 countries (stratified multi-stage sampling with routes, programs and regions as strata)
- Built on a prior 6-country study: MT21 (Schmidt, Blömeke & Tatto, 2011)
- Led by MSU, ACER, DPC & Statistics Canada; carried out in 2008, release 2010/2012; IEA quality criteria: response rates, weights, BRR (Tatto et al., 2012)

Blömeke, S., Suhl, U. & Kaiser, G. (2011). Teacher education effectiveness: Quality and equity of future primary teachers' mathematics and mathematics pedagogical content knowledge. *Journal of Teacher Education*, 62(2), 154-171.

Blömeke, S., Suhl, U., Kaiser, G. & Döhrmann, M. (2012). Family background, entry selectivity and opportunities to learn: What matters in primary teacher education? An international comparison of fifteen countries. *Teaching and Teacher Education*, 28, 44-55.

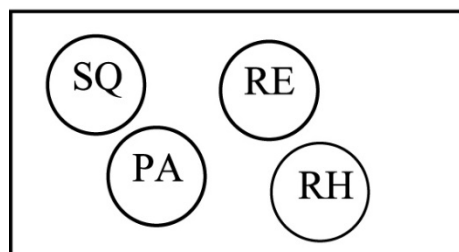


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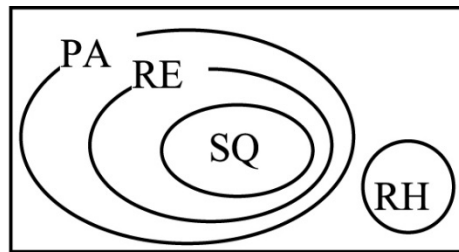
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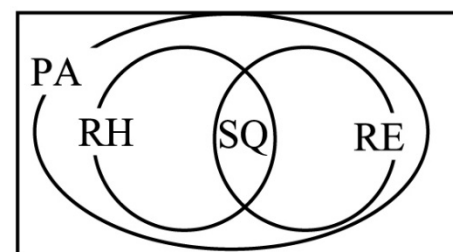
Three students have drawn the following Venn diagrams showing the relationships between four quadrilaterals: Rectangles (RE), Parallelograms (PA), Rhombuses (RH), and Squares (SQ).



[Tian]



[Rini]



[Mia]

Check one box.

A. [Tian]

B. [Rini]

C. [Mia]

**MCK/MPCK tests: 60 minutes,
paper-and-pencil,
2/3 MC, 1/3 CR items;
number/algebra/ geometry/data**

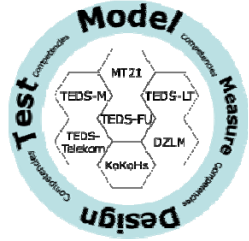
O_1

O_2

O_3

**More
examples:**

**tedsm@
msu.edu**



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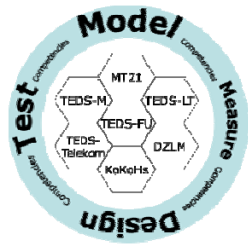


When teaching children about length measurement for the first time, Mrs. [Ho] prefers to begin by having the children measure the width of their book using paper clips, then again using pencils.

Give **TWO** reasons she could have for preferring to do this rather than simply teaching the children how to use a ruler?

Reason 1:

Reason 2:

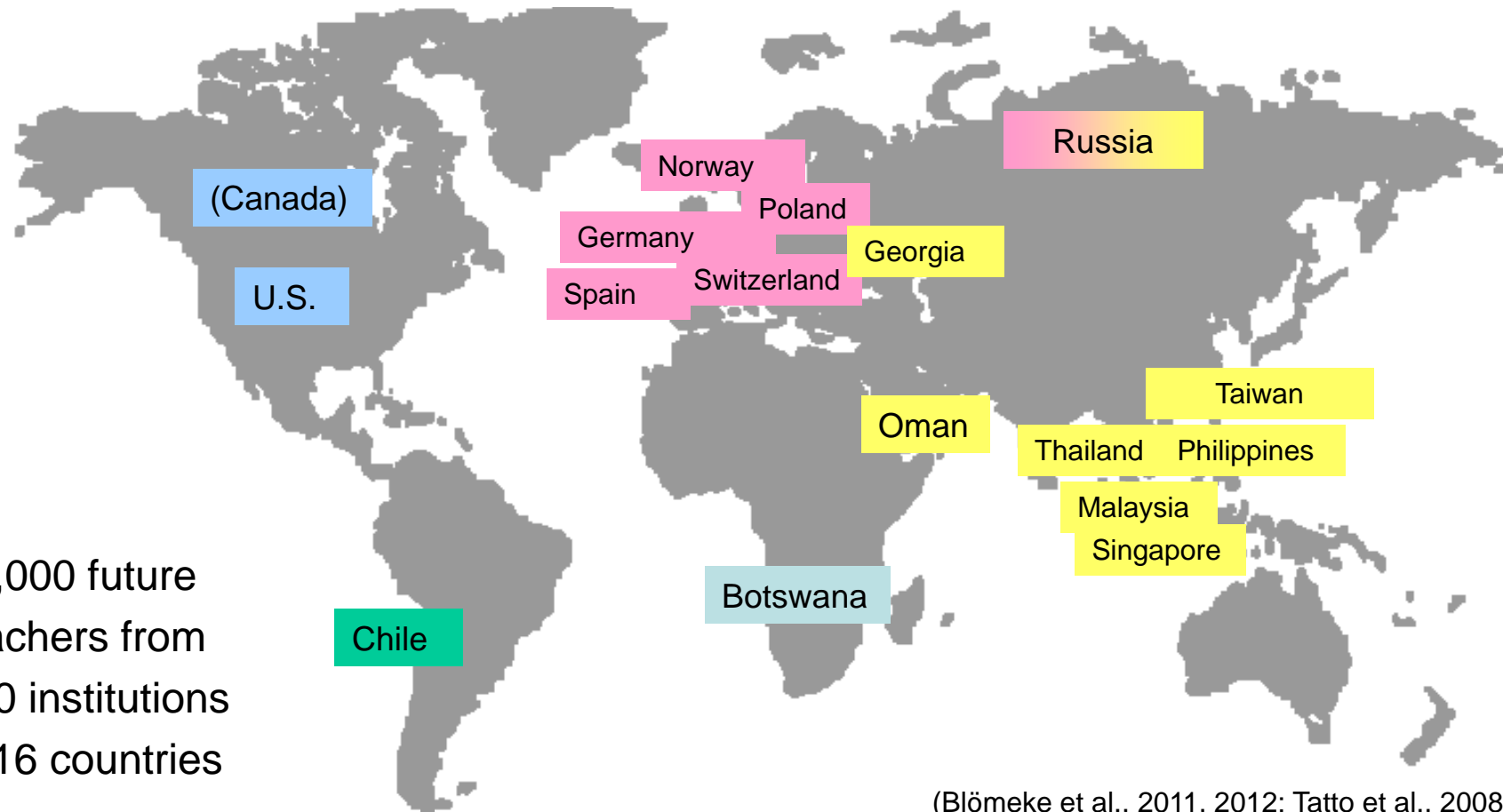


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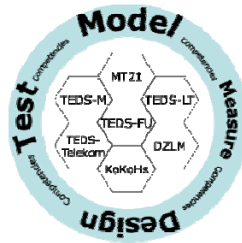
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Improving the validity with respect to cross-cultural validity



23,000 future teachers from 800 institutions in 16 countries

(Blömeke et al., 2011, 2012; Tatto et al., 2008, 2012)



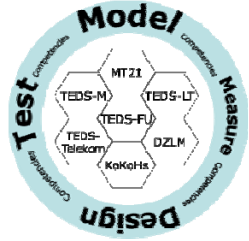
Mathematics Content Knowledge of future primary teachers

Country	Mean (SE)
Taiwan	626 (3.3)
Singapore	603 (2.9)
Switzerland*	549 (1.9)
Russia	536 (10.2)
Thailand	531 (2.1)
Norway*	530 (2.5)
USA*	529 (4.1)
Germany	514 (3.0)
International	500 (1.2)
Malaysia	493 (2.0)
Poland*	490 (2.0)
Spain	484 (2.9)
Botswana	438 (5.9)
Philippines	437 (8.7)
Chile*	409 (2.3)
Georgia	341 (3.3)
IEA	© TEDS-M Germany

* Reduced Coverage, Combined Participation Rate < 75% or other Limitations

- in general, stunningly similar country results to TIMSS/PISA:
Can we shed light on factors influencing student achievement this way?

(Blömeke et al., 2011; 2012)



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Suggestions for OECD's ITEL project

- Modeling teacher competence in a multidimensional way
- Modeling teacher competence as continuum including P-I-D skills

Assessment of important resources

Paper-and-pencil GPK test (building on existing comparative studies)

Survey of affective-motivational characteristics (using existing instruments)

Taking into account the mediating role of P-I-D (or direct behavior)

Development of a video-based assessment (or classroom observations)

Taking into account the role of domain-specific resources

Assessment of CK and PCK (building on existing comparative studies)