



Learning Sciences

Dylan **Wiliam** Center

National Teaching Policy: What is the key?

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Outline: three issues

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- Teacher quality
 - what it is
 - why it matters
 - how to get more of it
- Assessment
 - The bridge between teaching and learning
 - Different approaches to formative assessment
- Leadership for teacher learning
 - Content, then process
 - Making teacher learning the priority

Teacher quality

Teaching quality vs. teacher quality

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- Teaching quality depends on a number of factors
 - The time teachers have to plan teaching
 - The size of classes
 - The resources available
 - Material resources
 - Collegial support
 - The skills of the teacher
- All of these are important, but the quality of the teacher seems to be especially important

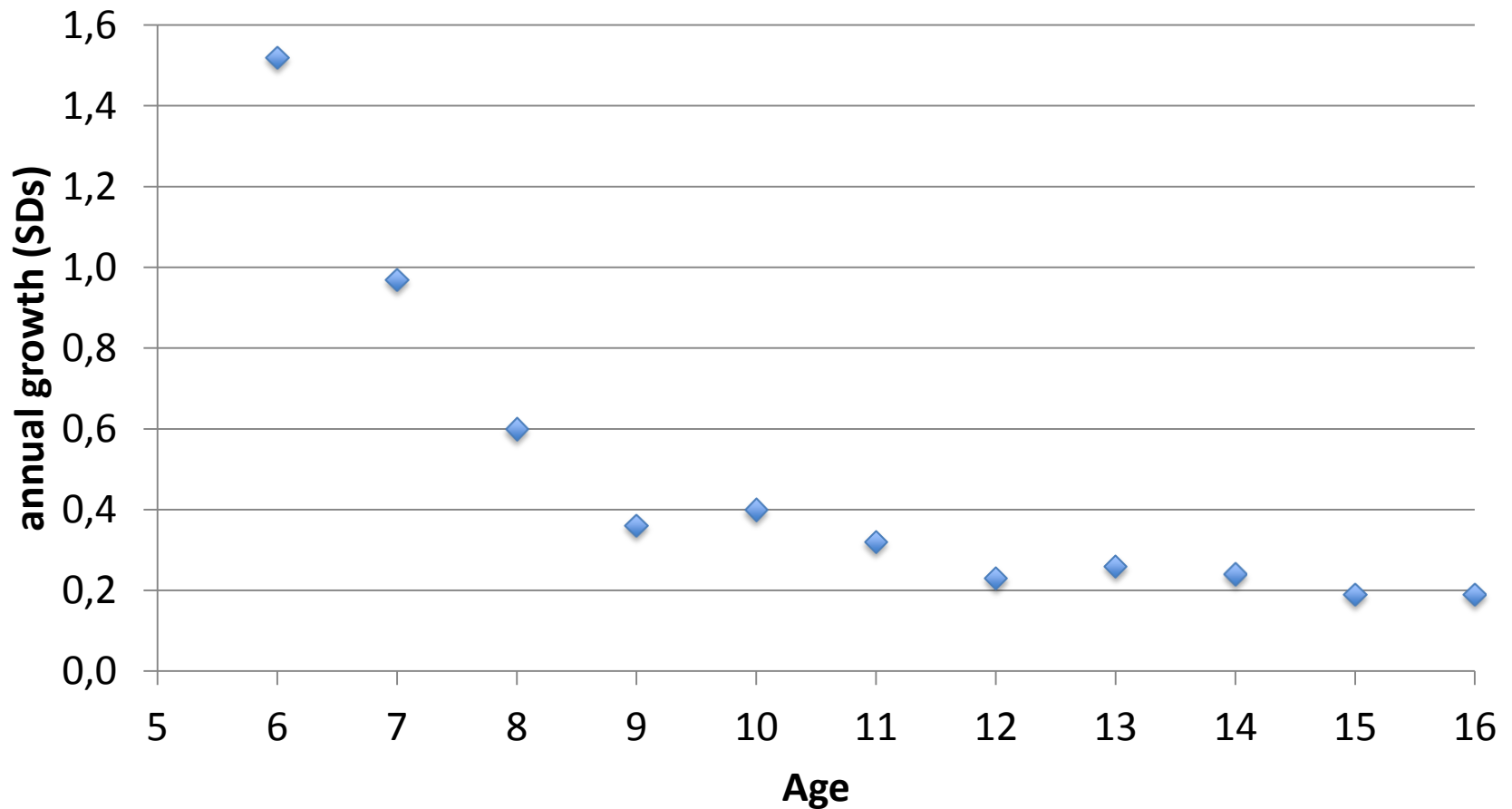
Teacher quality and student achievement

Study	Location	Reading	Math
Rockoff (2004)	New Jersey	0.10	0.11
Nye, Konstantopoulos, Hedges (2004)	Tennessee	0.26	0.36
Rivkin, Hanushek, and Kain (2005)	Texas	0.15	0.11
Aaronson, Barrow, and Sander (2007)	Chicago		0.13
Kane, Rockoff, and Staiger (2008)	New York City	0.08	0.11
Jacob and Lefgren (2008)		0.12	0.26
Kane and Staiger (2008)		0.18	0.22
Koedel and Betts (2009)	San Diego		0.23
Rothstein (2010)	North Carolina	0.11	0.15
Hanushek and Rivkin (2010)			0.11
Chetty et al. (2014)		0.12	0.16

Hanushek and Rivkin (2010)*

Annual growth in achievement, by age

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Bloom, Hill, Black, and Lipsey (2008)

- Assuming that
 - one year's student growth is 0.3 standard deviations
 - the correlation between teacher quality and student achievement is 0.15
- Then with a good teacher (1sd above the mean) students learn 50% more
- And with an outstanding teacher (2sd above the mean) they learn 100% more
- Note also that students make some progress through maturation so these are probably underestimates of the true effect (Fitzpatrick, Grissmer, & Hastedt, 2011)

Teacher quality

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- The impact of teacher quality (Hanushek & Rivkin, 2006)
 - In the classroom of the best teacher in a group of 50 teachers, students learn twice as fast as average.
 - In the classroom of the least effective teacher in a group of 50, students learn half as fast as average
 - And in the classrooms of the best teachers, students from disadvantaged backgrounds learn as much as others (Hamre & Pianta, 2005)
- Teachers make a difference
- But what makes the difference in teachers?
 - In particular, can we predict student progress from:
 - Teacher qualifications?
 - Value-added?
 - Teacher observation?

Teacher qualifications

Teacher qualifications and student progress

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	Mathematics			Reading		
	Primary	Middle	High	Primary	Middle	High
General theory of education courses					—	
Teaching practice courses				—	+	
Pedagogical content courses	+	+				
Advanced university courses			—			+
Aptitude test scores			—			

Harris and Sass (2007)

Teacher observations

Framework for teaching (Danielson 1996)

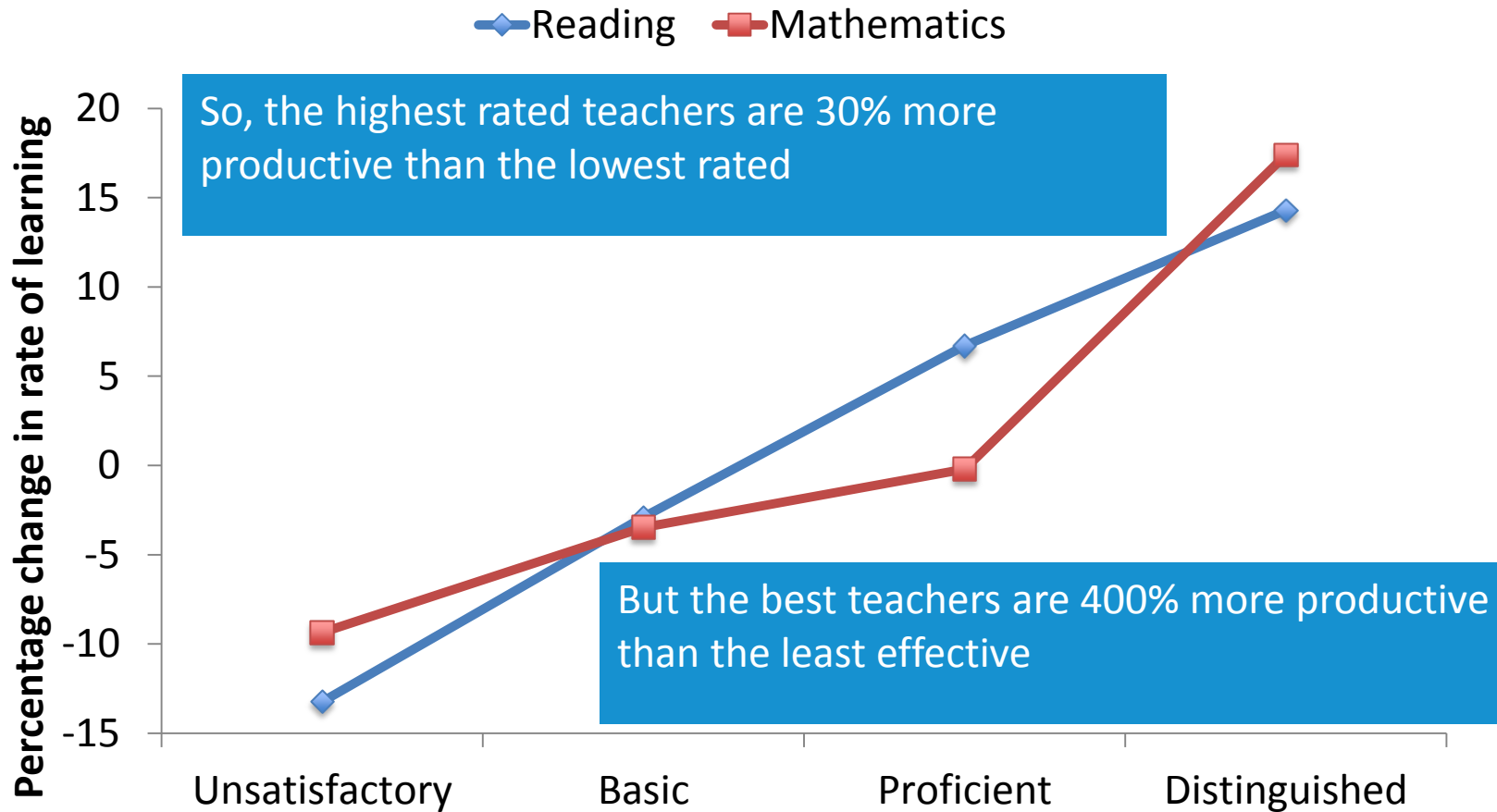
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- Four domains of professional practice
 1. Planning and preparation
 2. Classroom environment
 3. Instruction
 4. Professional responsibilities
- Links with student achievement (Sartain, et al. 2011)
 - Domains 1 and 4: no impact on student achievement
 - Domains 2 and 3: some impact on student achievement

A framework for teaching (Danielson, 1996)

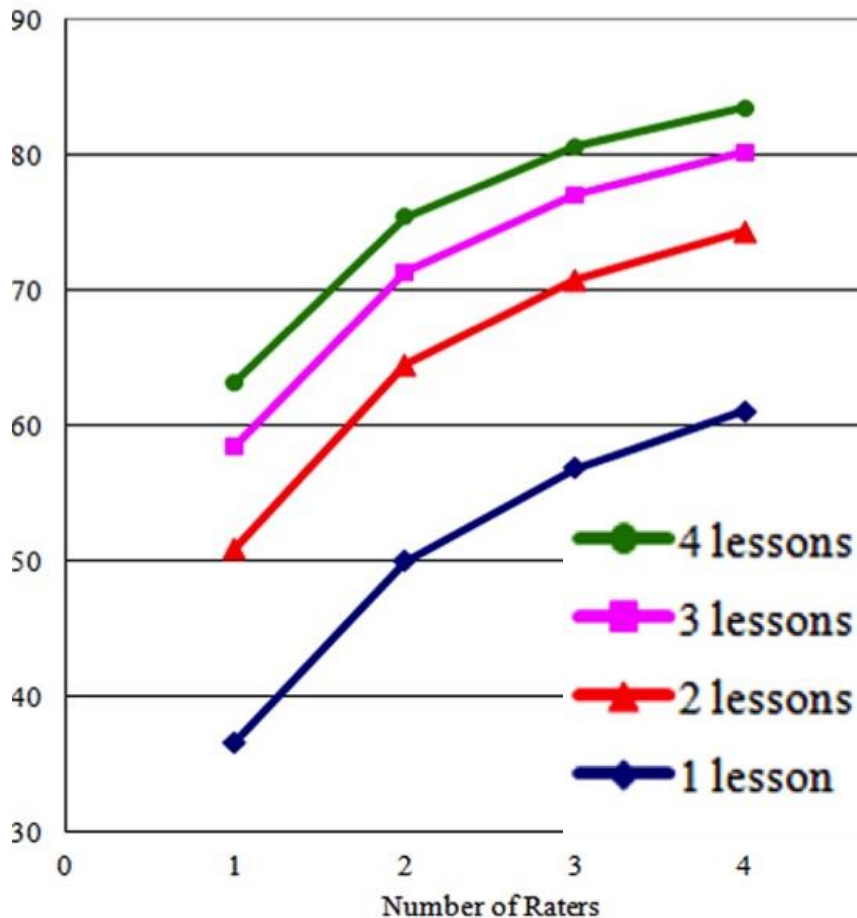
- Domain 2: The classroom environment
 - 2a: Creating an environment of respect and rapport
 - 2b: Establishing a culture for learning
 - 2c: Managing classroom procedures
 - 2d: Managing student behavior
 - 2e: Organizing physical space
- Domain 3: Instruction
 - 3a: Communicating with students
 - 3b: Using questioning and discussion techniques
 - 3c: Engaging students in learning
 - 3d: Using assessment in instruction
 - 3e: Demonstrating flexibility and responsiveness

Observations and teacher quality



Imprecision of lesson observations

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Achieving a reliability of 0.9 in judging teacher quality through lesson observation is likely to require observing a teacher teaching 6 different classes, and for each lesson to be judged by 5 independent observers.

Hill, Charalambous and Kraft (2012)

What we know about teacher observation

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- To recap
 - The highest rated teachers generate learning 30% faster than the lowest rated teachers
 - But the most effective teachers generate learning 400% faster than the least effective teachers
 - So the best observation systems we have capture less than 10% of teacher quality (in reality, less than this because most teachers are in the middle two categories)

Teacher value-added

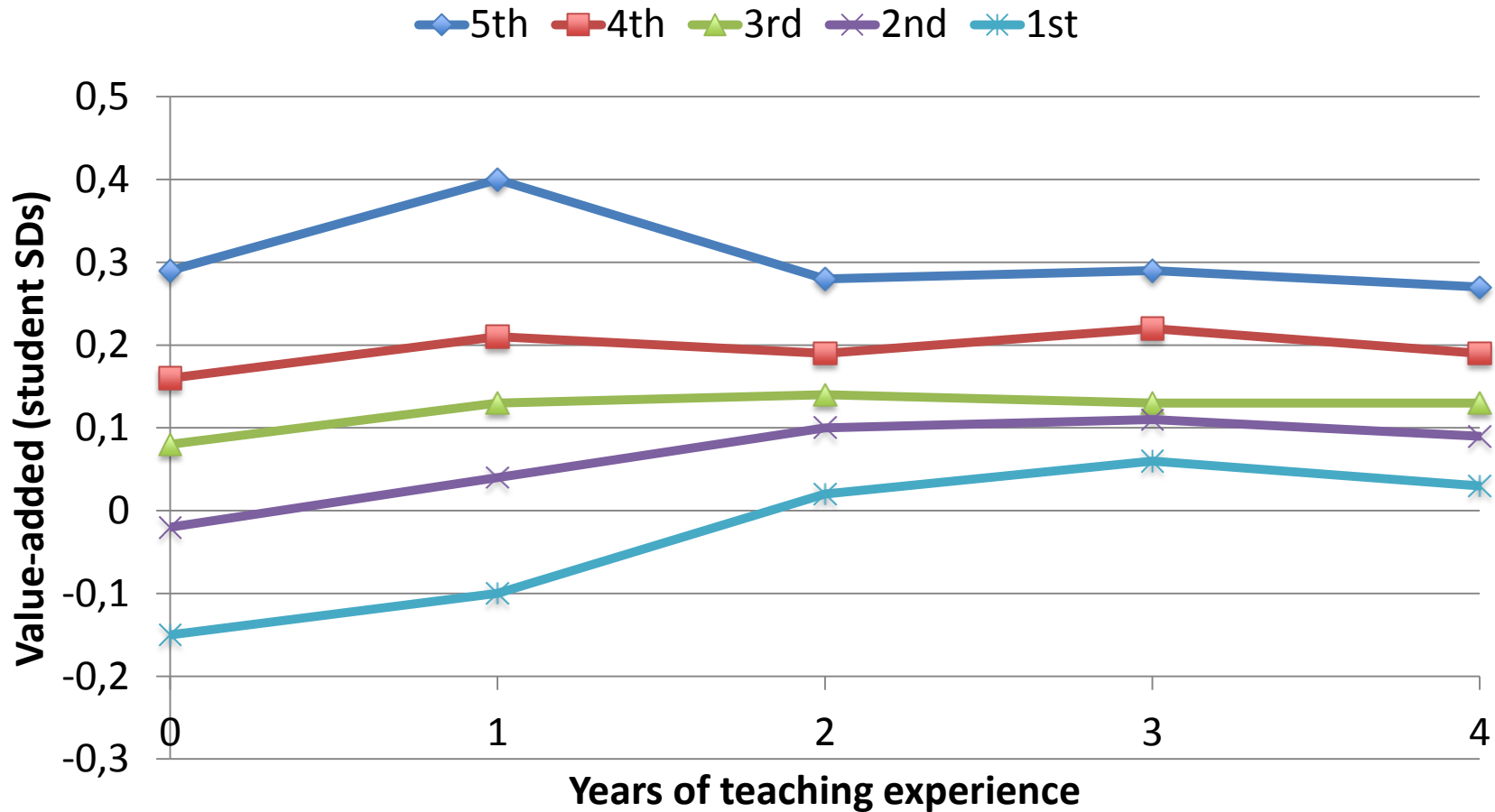
Teacher value-added

		Value-added quintile: Student fixed-effects model				
		1	2	3	4	5
Value-added quintile: Traditional model	1	38	22	24	16	0
	2	26	28	15	20	11
	3	20	20	20	24	16
	4	13	24	26	13	24
	5	9	5	12	28	47

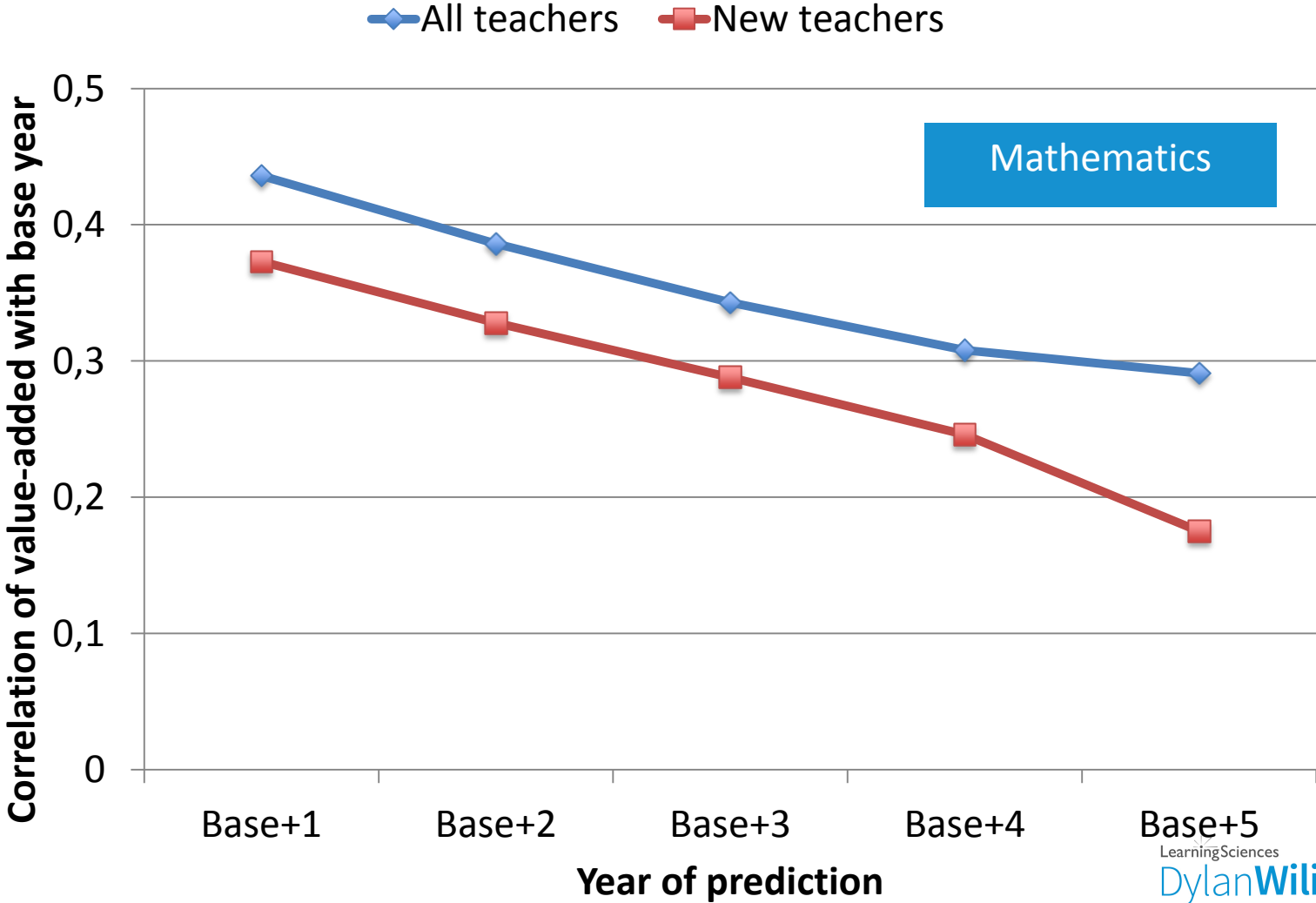
Goldhaber, Goldschmidt, and Tseng (2013)

Mathematics

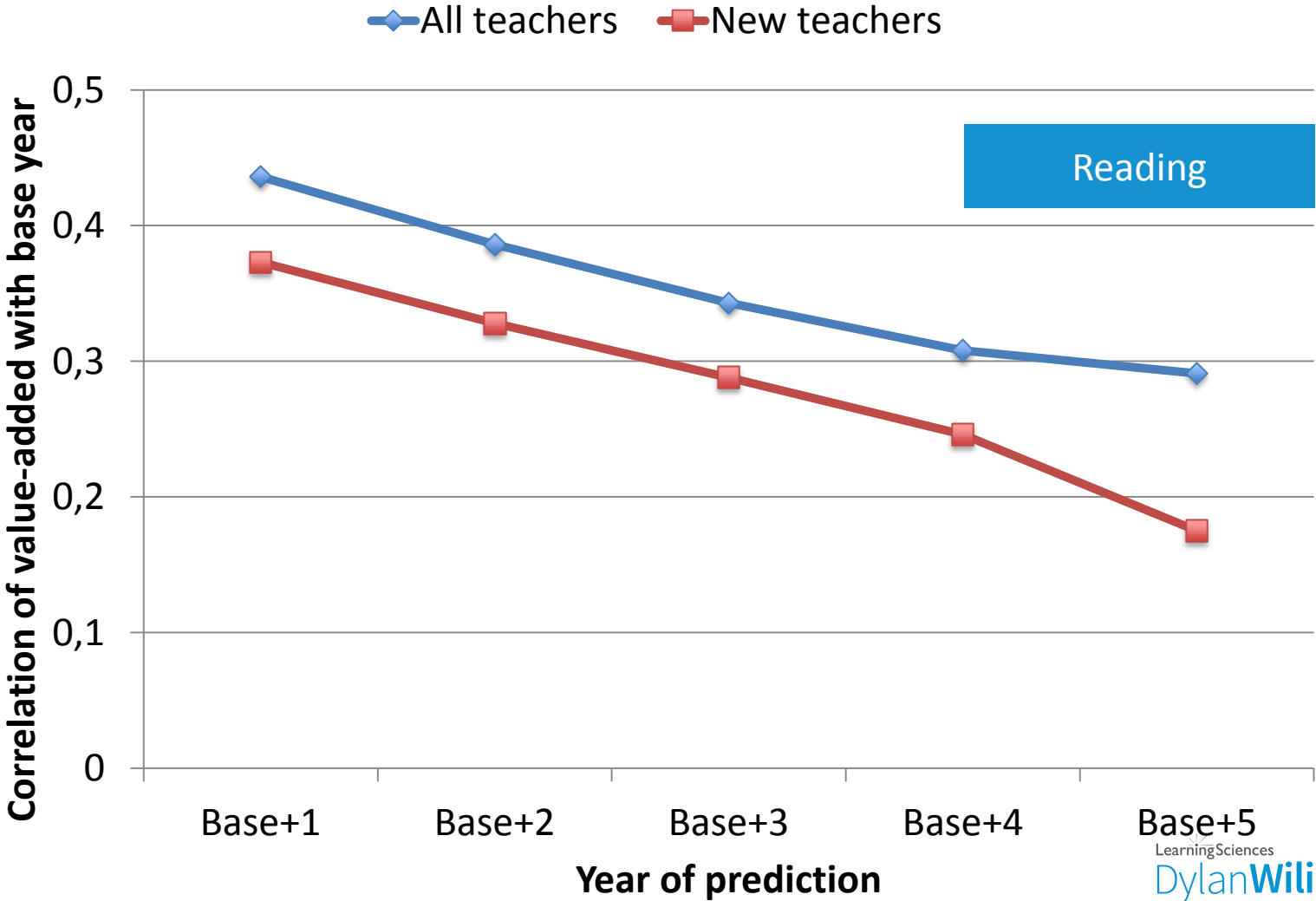
Quintile of teacher value-added



Correlation of initial and later performance



Correlation of initial and later performance



Issues with value-added models for teachers

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- Different (reasonable) models of value-added give very different estimates of teacher quality (Goldhaber, Goldschmidt and Tseng, 2013)
- Teacher value-added in their first year accounts for less than 5% of the variation in teacher quality in their fifth year of teaching (Atteberry, Loeb and Wyckoff, 2013)
- Teachers benefit students for at least three years after they stop teaching them (Rothstein, 2010)

To sum up...

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- We cannot accurately evaluate teachers
 - From their qualifications
 - By observing them
 - By measuring their impact on student achievement
 - From a combination of all of these measures
- We would be better off spending our time improving our teachers than evaluating them
- But what should teachers improve?

So what should teachers improve?

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- In education, meta-analysis is an unreliable guide
 - File drawer problem
 - Selection of studies
 - Dosage/intensity
 - Variation in variability
 - Sensitivity to instruction
- Best-evidence synthesis

The relationship of formative assessment to other policy priorities

The evidence base for formative assessment

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- Fuchs & Fuchs (1986)
- Natriello (1987)
- Crooks (1988)
- Bangert-Drowns, et al. (1991)
- Dempster (1991, 1992)
- Elshout-Mohr (1994)
- Kluger & DeNisi (1996)
- Black & Wiliam (1998)
- Nyquist (2003)
- Brookhart (2004)
- Allal & Lopez (2005)
- Köller (2005)
- Brookhart (2007)
- Wiliam (2007)
- Hattie & Timperley (2007)
- Shute (2008)

Recent meta-analytic findings

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Content area	N	95% confidence interval for effect size		
		Lower	Mean	Upper
Mathematics	19	0.14	0.17	0.20
English Language Arts	4	0.30	0.32	0.34
Science	17	0.06	0.19	0.31
Total	40			

Mean effect size ≈ 0.20

A *big* effect size

Equivalent to a 50% to 70% increase in the rate of learning

Formative Assessment: A contested term

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	Long-cycle	Medium-cycle	Short-cycle
Span	Across terms, teaching units	Within and between teaching units	Within and between lessons
Length	Four weeks to one year	One to four weeks	Minute-by-minute and day-by-day
Impact	Monitoring, curriculum alignment	Student-involved assessment	Engagement, responsiveness

Unpacking Formative Assessment

	Where the learner is going	Where the learner is now	How to get the learner there
Teacher	Clarifying, sharing, and understanding learning intentions	Engineering effective discussions, tasks, and activities that elicit evidence of learning	Providing feedback that moves learners forward
Peer		Activating students as resources for one another	
Student		Activating students as owners of their own learning	

Unpacking Formative Assessment

	Where the learner is going	Where the learner is now	How to get the learner there
Teacher			
Peer			
Student			

Using evidence of achievement to adapt what happens in classrooms to meet learner needs

An educational positioning system

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- A good teacher:
 - Establishes where the students are in their learning
 - Identifies the learning destination
 - Carefully plans a route
 - Begins the learning journey
 - Makes regular checks on progress on the way
 - Makes adjustments to the course as conditions dictate

The relationship of formative assessment to other policy priorities

Educational Endowment Foundation toolkit

Intervention	Cost	Quality of evidence	Extra months of learning
Feedback	££	□□□	+8
Metacognition and self-regulation	££	□□□□	+8
Peer tutoring	££	□□□□	+6
Early years intervention	£££££	□□□□	+6
One to one tuition	££££	□□□□	+5
Homework (secondary)	£	□□□	+5
Collaborative learning	£	□□□□	+5
Phonics	£	□□□□	+4
Small group tuition	£££	□□□□	+4
Behaviour interventions	£££	□□	+4
Digital technology	££££	□□□□	+4
Social and emotional learning	£	□□□□	+4

Educational Endowment Foundation toolkit

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Intervention	Cost	Quality of evidence	Extra months of learning
Parental involvement	£££	□□□	+3
Reducing class size	£££££	□□□	+3
Summer schools	£££	□□	+3
Sports participation	£££	□□	+2
Arts participation	££	□□□	+2
Extended school time	£££	□□	+2
Individualized instruction	£	□□□	+2
After school programmes	££££	□□	+2
Learning styles	£	□□□	+2
Mentoring	£££	□□□	+1
Homework (primary)	£	□□□	+1

Educational Endowment Foundation toolkit

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Intervention	Cost	Quality of evidence	Extra months of learning
Teaching assistants	££££	□□	0
Performance pay	££	□	0
Aspiration interventions	£££	□	0
Block scheduling	£	□□	0
School uniform	£	□	0
Physical environment	££	□	0
Ability grouping	£	□□□	-1

Unpacking Formative Assessment

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	Where the learner is going	Where the learner is now	How to get the learner there
Teacher	Clarifying, sharing, and understanding learning intentions	Eliciting evidence of learning	Providing feedback that moves learners forward
Peer		Activating students as resources for one another	
Student		Activating students as owners of their own learning	

So much for the easy bit

A model for teacher learning

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- Content, then process
- Content (what we want teachers to change):
 - Evidence
 - Ideas (strategies and techniques)
- Process (how to go about change):
 - Choice
 - Flexibility
 - Small steps
 - Accountability
 - Support

Supportive accountability

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- What is needed from teachers:
 - A commitment to:
 - The continual improvement of practice
 - Focus on those things that make a difference to students
- What is needed from leaders:
 - A commitment to engineer effective learning environments for teachers by:
 - Creating expectations for continually improving practice
 - Keeping the focus on the things that make a difference to students
 - Providing the time, space, dispensation, and support for innovation
 - Supporting risk-taking



Thank you

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