CS 375

Survey.

CS 375

Survey.

Research on learning.

CS 375

Survey.

Research on learning.

Bloom (what I tell students.)

CS 375

Survey.

Research on learning.

- Bloom (what I tell students.)
- Retrieval.

CS 375

Survey.

Research on learning.
- Bloom (what I tell students.)
- Retrieval.
- Summary/myths.

Survey:Likes

Discuss with other TAs.

Survey:Likes

Discuss with other TAs.

+

Survey:Likes

Discuss with other TAs.

+ +

Survey:Likes

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+ + +

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Survey:Likes

Discuss with other TAs.

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Research Presentation.

Survey:Likes

Discuss with other TAs.

+ + + + + + + + + + + + + +

Research Presentation.

+

Survey:Likes

Discuss with other TAs.

+ + + + + + + + + + + + + +

Research Presentation.

+ +

Survey:Likes

Discuss with other TAs.

+ + + + + + + + + + + + + +

Research Presentation.

+ + +

Survey:Likes

Discuss with other TAs.

+ + + + + + + + + + + + + +

Research Presentation.

+ + + +.5

Survey:Likes

Discuss with other TAs.

+ + + + + + + + + + + + + +

Research Presentation.

+ + + +.5 + .5

Survey:Likes

Discuss with other TAs.

+ + + + + + + + + + + + + +

Research Presentation.

+ + + +.5 + .5 +

Survey:Likes

Discuss with other TAs.

+ + + + + + + + + + + + + +

Research Presentation.

+ + + +.5 + .5 +

Video Feedback.

Survey:Likes

Discuss with other TAs.

+ + + + + + + + + + + + + +

Research Presentation.

+ + + +.5 + .5 +

Video Feedback.

+

Survey:Likes

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Video Feedback.

+

Survey:Likes

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+ + + + + + + + + + + + + +

Research Presentation.

+ + + +.5 + .5 +

Video Feedback.

+

Self Reflection/feedback.

Survey:Likes

Discuss with other TAs.

+ + + + + + + + + + + + + +

Research Presentation.

+ + + +.5 + .5 +

Video Feedback.

+

Self Reflection/feedback.

+

Survey:Likes

Discuss with other TAs.

+ + + + + + + + + + + + + +

Research Presentation.

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Video Feedback.

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Survey:Likes

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+ + + + + + + + + + + + + +

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Discuss with other TAs.

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+ + + +

Survey:Likes

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+ + + + + + + + + + + + + +

Research Presentation.

+ + + +.5 + .5 +

Video Feedback.

+

Self Reflection/feedback.

+ + + + +

Survey:Likes

Discuss with other TAs.

+ + + + + + + + + + + + + +

Research Presentation.

+ + + +.5 + .5 +

Video Feedback.

+

Self Reflection/feedback.

+ + + + +

Tools For Teaching

Survey:Likes

Discuss with other TAs.

+ + + + + + + + + + + + + +

Research Presentation.

+ + + +.5 + .5 +

Video Feedback.

+

Self Reflection/feedback.

+ + + + +

Tools For Teaching

+

Survey:Likes

Discuss with other TAs.

+ + + + + + + + + + + + + +

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Video Feedback.

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Tools For Teaching

+ +

Survey:Likes

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Self Reflection/feedback.

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Tools For Teaching

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Survey:Likes

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Tools For Teaching

+ + + + +

Questions.

How to deal with time consuming questions when others are waiting/more material to cover?

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Students not willing to work together in groups.

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Too lenient on students.

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Too lenient on students.

How do you design lesson plans?

My own issues affects my teaching. How to balance time.

Experiences, Comments

Teaching is harder than it looks.

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Like it when you know their names!

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I taught a man to fish!
Went over debugging strategy in OH.

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Woman being ignored

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Fun to try things from 375, and some even work!

I taught a man to fish!
Went over debugging strategy in OH.
Student finds bug. Student way happy!
Success!

Woman being ignored...talked over.

I should do better.

Shorter Meetings.

I should do better.

Shorter Meetings. +

I should do better.

Shorter Meetings. + +

I should do better.

Shorter Meetings. + + +.

I should do better.

Shorter Meetings. + + +. I'm hungry!

I should do better.

Shorter Meetings. + + +. I'm hungry! ++

I should do better.

Shorter Meetings. + + +. I'm hungry! ++

How do we apply results from studies?

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Better outline of due dates on course website.

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Doing well in this class..

The Bloom 2-sigma effect.

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One on one instruction and mastery learning leads to a two sigma improvement in performance.

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50th percentile to the 98th percentile.

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The median Harvard applicant would get in!

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One on one instruction ....

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One on one instruction ....for 300 students

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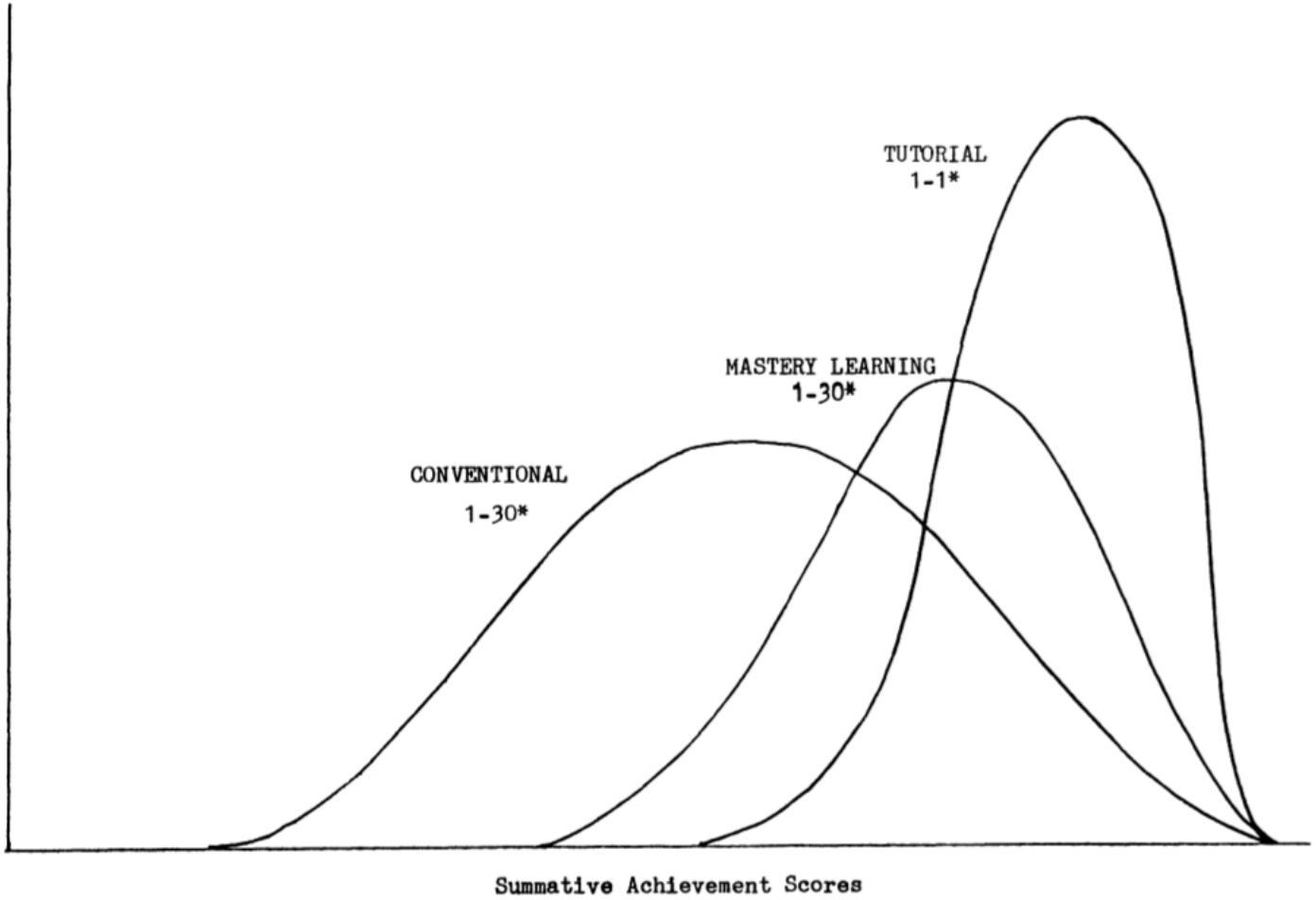
Resources: office hours, discussion, piazza,...

and .. you!

You have the book, homeworks, exams, slides, and the web...

Bloom figure

FIGURE 1. *Achievement distribution for students under conventional, mastery learning, and tutorial instruction.*



*Teacher-student ratio

We should..

Capture the bloom effect ..

We should..

Capture the bloom effect ..

.. in the classroom.

We should..

Capture the bloom effect ..

.. in the classroom.

.. using a computer.

We should..

Capture the bloom effect ..

.. in the classroom.

.. using a computer.

Re: the former.

We should..

Capture the bloom effect ..

.. in the classroom.

.. using a computer.

Re: the former.
- Some improvement in forty years.

We should..

Capture the bloom effect ..

.. in the classroom.

.. using a computer.

Re: the former.
- Some improvement in forty years.
- Except for high school.

We should..

Capture the bloom effect ..

.. in the classroom.

.. using a computer.

Re: the former.
- Some improvement in forty years.
- Except for high school.
No better on NEAP since 1974.

For the latter...

Computer tutoring: roughly perhaps .79 standard deviations.

For the latter...

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Versus Human.

For the latter...

Computer tutoring: roughly perhaps .79 standard deviations.

Versus Human.

Why would humans be better? Discuss.

For the latter...

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In some detail at VanLehn 2011.

For the latter...

Computer tutoring: roughly perhaps .79 standard deviations.

Versus Human.

Why would humans be better? Discuss.

In some detail at VanLehn 2011.

For review, and perhaps support and/or falsification.

Retrieval Learning: The experiment(s)

- A passage.

Retrieval Learning: The experiment(s)

- A passage.
- Study via

Retrieval Learning: The experiment(s)

- A passage.
- Study via
  1. Repeated study.
  2. Questions.
  3. Concept Mapping.

Metacogition.

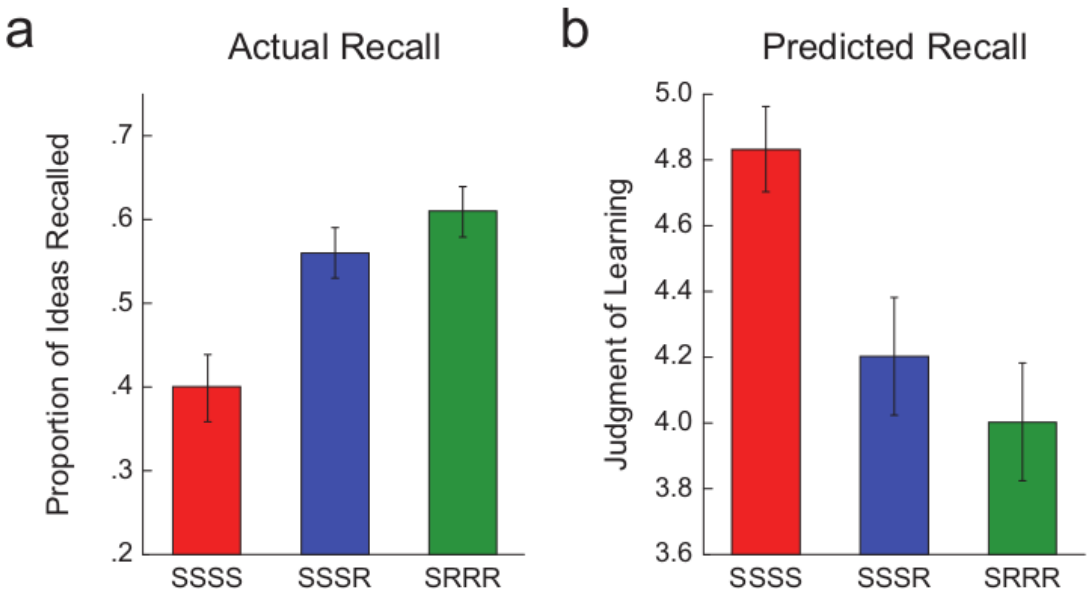

Fig. 1. Final recall (a) after repeatedly studying a text in four study periods (SSSS condition), reading a text in three study periods and then recalling it in one retrieval period (SSSR condition), or reading a text in one study period and then repeatedly recalling it in three retrieval periods (SRRR condition). Judgments of learning (b) were made on a 7-point scale, where 7 indicated that students believed they would remember material very well. The data presented in these graphs are adapted from Experiment 2 of Roediger and Karpicke (2006b). The pattern of students' metacognitive judgments of learning (predicted recall) was exactly the opposite of the pattern of students' actual long-term retention.

One-week Later.

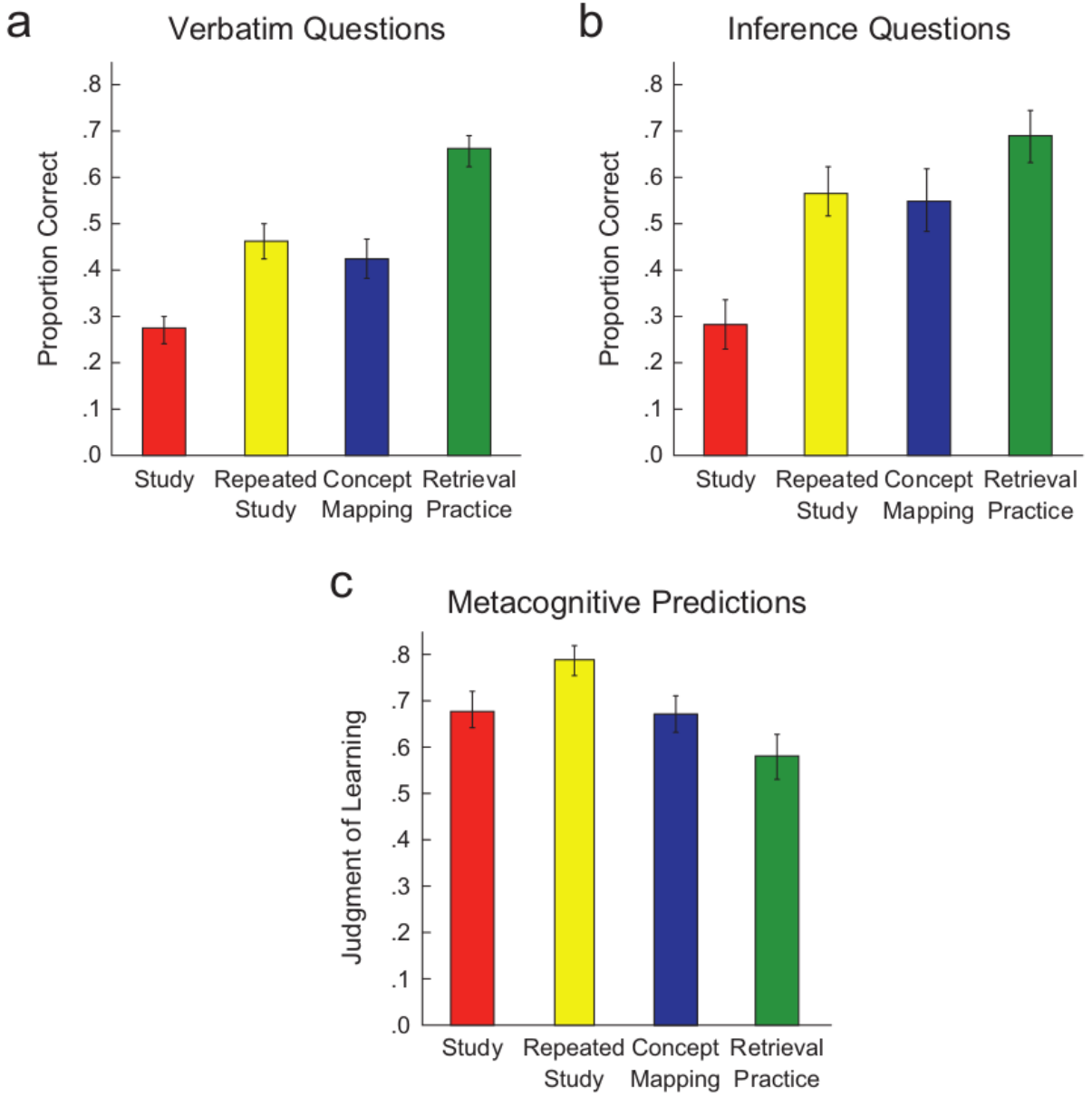

Fig. 3. Proportion correct on final short-answer verbatim questions (a) and inference questions (b) 1 week after learning, and metacognitive judgments of learning (predicted proportion of items correct) made during the initial learning phase (c).

Response.

Comment on “Retrieval Practice Produces More Learning than Elaborative Studying with Concept Mapping”
Joel J. Mintzes1, and a bunch of people.

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Comment on “Retrieval Practice Produces More Learning than Elaborative Studying with Concept Mapping”
Joel J. Mintzes1, and a bunch of people.
Karpicke and Blunt (Reports, 11 February 2011, p. 772) reported that retrieval practice produces greater gains in learning than elaborative studying with concept mapping and concluded that this strategy is a powerful way to promote meaningful learning of complex concepts commonly found in science education. We question their findings on methodological and epistemological grounds.

More Response.

In particular, the conclusion that “Retrieval practice is a powerful way to promote meaningful learning of complex concepts commonly found in science education” may be taken by some as an endorsement of frequent classroom testing in lieu of recent practices in science teaching that are supported by an avalanche of research over a period of three or more decades (4-6).

Response to Response.

Mintzes et al. (1) speculate that students are more familiar with retrieval practice than they are with concept mapping. However, it is questionable to assume that students are highly familiar with retrieval practice. Research on students' metacognitive awareness consistently shows that most students lack awareness of the benefits of retrieval practice and do not use this strategy (11,12). More important, familiarity with a learning activity need not have anything to do with its effectiveness. For instance, repetitive reading is the most frequently reported strategy among college students (12), yet there are numerous studies in which this familiar strategy produces little or no learning (13). Consider another example: Deleting letters from expository texts improves learning and comprehension because of the generative processing afforded by letter deletion (14). We are confident that students do not commonly read texts with missing letters, yet the activity boosts learning. Mintzes et al. assume a causal link between task familiarity and learning, but that assumption is incorrect.

Huh? Deleting letters.

TABLE 1

EXPERIMENT 1: PROCESSING TIME, COMPREHENSION RATING, AND PROPORTION OF PROPOSITIONS RECALLED AS A FUNCTION OF TYPE OF TASK AND TYPE OF TEXT

Dependent measure	Type of text	Type of Task: Read-only control	Letter deletion	Embedded questions	Sentence reordering	Outlining
Recall	Fairy tale	.45	.56	.59	.52	.51
	Descriptive	.28	.19	.36	.43	.46
Time[a]	Fairy tale	1.48	8.20	8.25	7.80	8.57
	Descriptive	1.87	12.60	6.75	13.43	13.96
Comprehensing rating[b]	Fairy tale	1.50	1.33	2.00	1.92	1.33
	Descriptive	1.83	2.08	1.83	1.75	2.08

[a] Measured in minutes.

[b] Lower numbers indicate higher comprehension.

Huh? Deleting letter: longer term.

TABLE 2

EXPERIMENT 2: PROCESSING TIME, COMPREHENSION RATING, AND PROPORTION OF PROPOSITIONS RECALLED AS A FUNCTION OF TYPE OF TASK, TYPE OF TEXT, AND DELAY OF TESTING

Dependent measure	Time of recall	Type of text	Read-only control	Letter deletion	Sentence reordering
Recall	Immediate	Fairy tale	.45	.56	.52
		Descriptive	.28	.19	.43
	One-week	Fairy tale	.23	.36	.43
		Descriptive	.15	.11	.26
Time[a]	Immediate	Fairy tale	1.48	8.20	7.80
		Descriptive	1.87	12.60	13.43
	One-week	Fairy tale	1.57	8.74	9.97
		Descriptive	2.01	10.18	16.83
Comprehension rating[b]	Immediate	Fairy tale	1.50	1.33	1.92
		Descriptive	1.83	2.08	1.75
	One-week	Fairy tale	1.58	1.08	1.33
		Descriptive	2.42	1.58	2.25

[a] Measured in minutes.
[b] Lower numbers indicate higher comprehension.

What to do?

Questions in text help learning.

What to do?

Questions in text help learning.

Challenging students help learning.

What to do?

Questions in text help learning.

Challenging students help learning.

Discussion.

What to do?

Questions in text help learning.

Challenging students help learning.

Discussion.

- What should we do as teachers?
- What should we suggest as teachers?

Common Sense

Students need to make effort!

Common Sense

Students need to make effort!

Bloom:

Common Sense

Students need to make effort!

- Bloom: tutors force it.

Common Sense

Students need to make effort!

- Bloom: tutors force it.
- Retrieval

Common Sense

Students need to make effort!

- Bloom: tutors force it.
- Retrieval effort.

Common Sense

Students need to make effort!

- Bloom: tutors force it.
- Retrieval effort.
- Muller Video

Common Sense

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- Bloom: tutors force it.
- Retrieval effort.
- Muller Video claims it.

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Caveat: Perhaps not too much.

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What to do?

More common sense?

Great teachers

More common sense?

Great teachers ?

More common sense?

Great teachers ?

Not so much.

More common sense?

Great teachers ?

Not so much.
Research.

More common sense?

Great teachers ?

Not so much.

Research.

”Research shows 4-6 months of learning gain/year”

More common sense?

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Not so much.

Research.

”Research shows 4-6 months of learning gain/year”

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"Research shows 4-6 months of learning gain/year"
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Predict teacher performance from...

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Gates Study: 3 year study.

Predict teacher performance from...
(1) Student ratings.
(2) Observer ratings.

More common sense?

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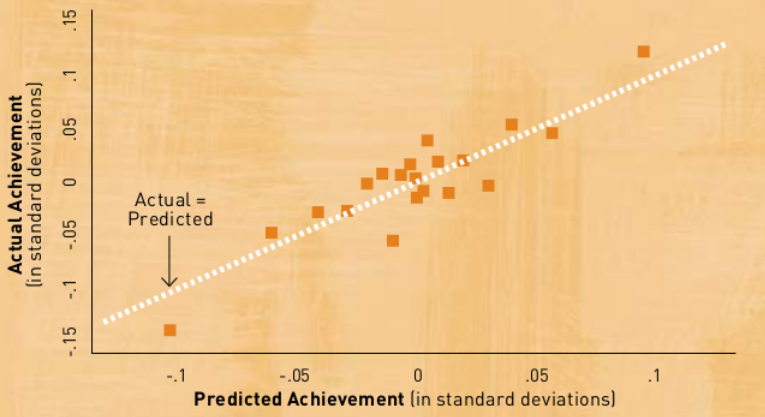
MET Graph

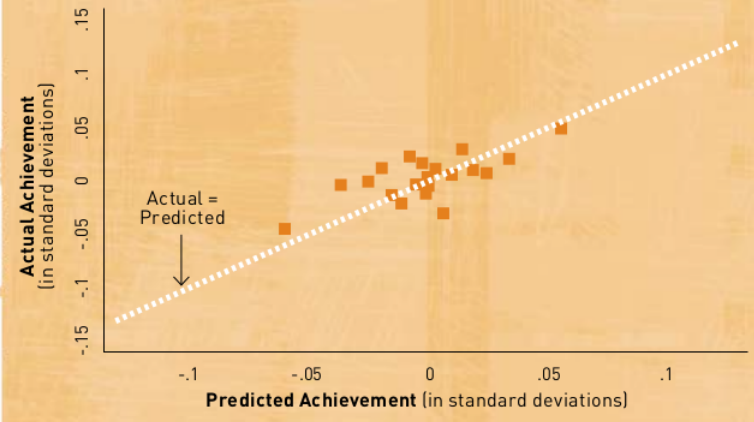
Figure 2

Effectiveness Measures Identify Teachers Who Help Students Learn More

Actual and Predicted Achievement of Randomized Classrooms (Math)



Actual and Predicted Achievement of Randomized Classrooms (English Language Arts)



These charts compare the actual 2010–11 school year achievement gains for randomly assigned classrooms with the results that were predicted based on the earlier measures of teaching effectiveness. Each dot represents the combination of actual and estimated student performance for 5 percent of the teachers in the study, grouped by the teachers' estimated effectiveness. The dashed line shows where the dots would be if the actual and predicted gains matched perfectly.

On average, students of teachers with higher teacher effectiveness estimates outperformed students of teachers with lower teacher effectiveness estimates. Moreover, the magnitude of students' actual gains largely corresponded with gains predicted by their effectiveness measured the previous year. Both the actual and predicted achievement are reported relative to the mean in the randomization block. That is, a zero on either axis implies that the value was no different from the mean for the small group of teachers in a grade, subject, and school within which class lists were randomized.

Impacts are reported in student-level standard deviations. A .25 standard deviation difference is roughly equivalent to a year of schooling. The predicted impacts are adjusted downward to account for incomplete compliance with randomization.

MET Graph

Figure 2

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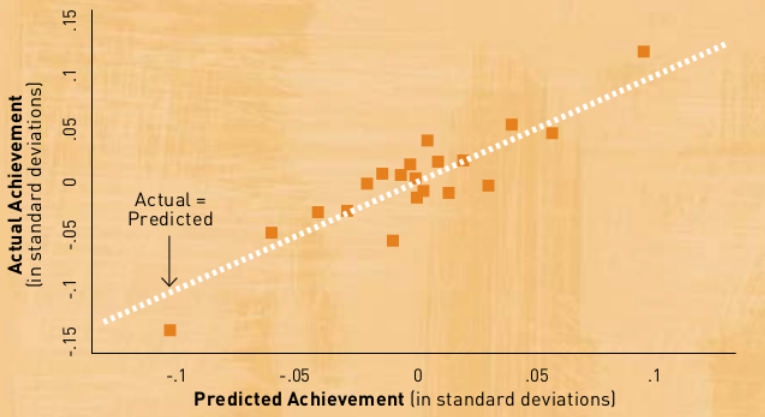

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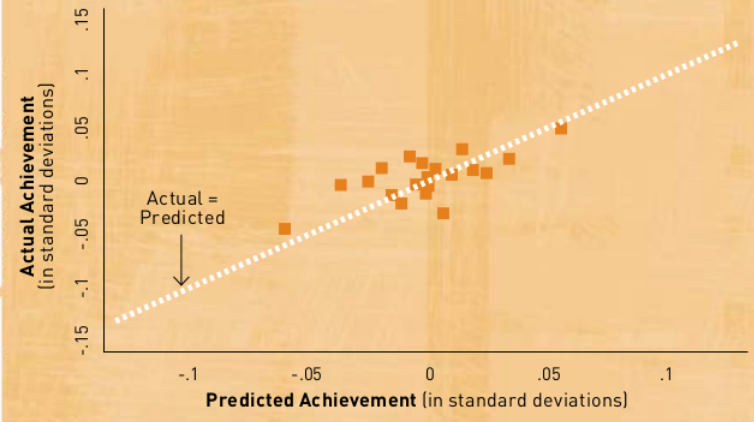

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MET Factors for effectiveness.

Table 1

USING TEACHER PERFORMANCE MEASURES IN 2009–10 TO PREDICT STUDENT ACHIEVEMENT GROWTH IN 2008–09

	Elementary Grades							
	State Math				State English Language Arts			
	1	2	3	4	5	6	7	8
Value-Added Measure from 2009–10	0.396***	0.410***			0.350***	0.306***		
	(0.029)	(0.041)			(0.031)	(0.040)		
Student Survey Score (Tripod) in 2009–10		0.060	0.164***			0.074*	0.147***	
		(0.051)	(0.053)			(0.040)	(0.040)	
Classroom Observation Score (FFT) in 2009–10		0.042		0.110*		0.013		0.050
		(0.054)		(0.058)		(0.042)		(0.044)
Controls for Teacher Experience, MA Degree?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	782	377	405	392	828	390	417	403
R-squared	0.203	0.240	0.032	0.024	0.134	0.169	0.038	0.012

What is the point?

Everybody reads!

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130 years ago, it was thought only few could.

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