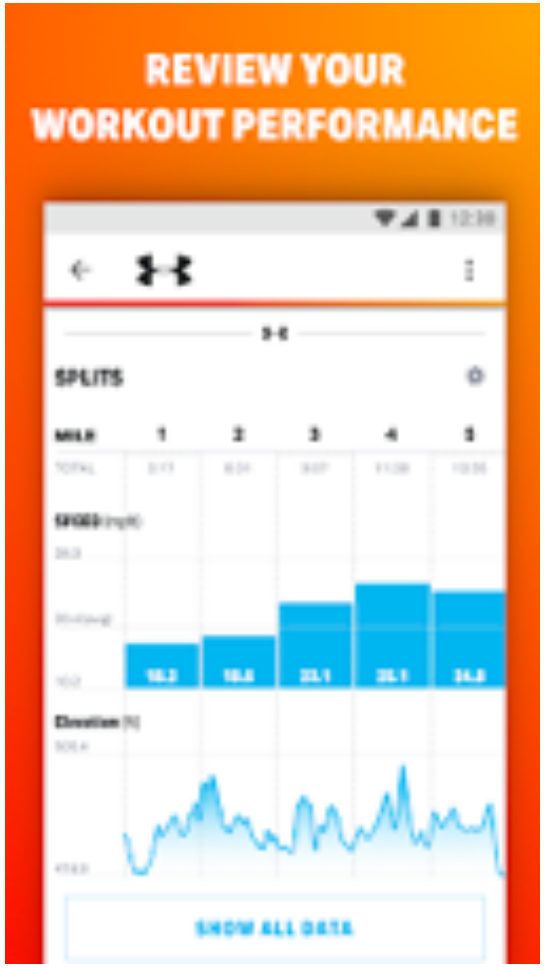
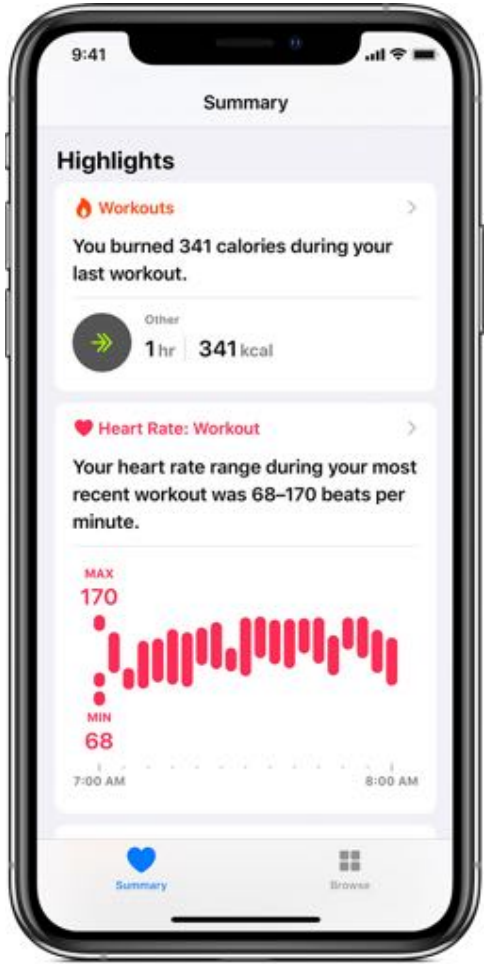
Don’t Put the Cart Before the Horse

Decision-Driven Data Collection in Formative Assessment Practices

IDOE Assessment Literacy Conference
November 7-8, 2019

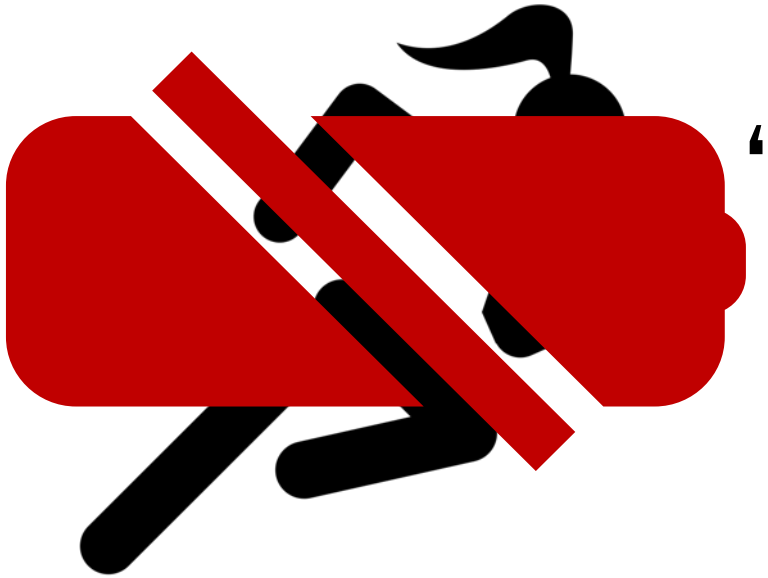
Data-Obsessed Culture





“Quantified Self” Study

by Farzana Dudhwala
University of Oxford



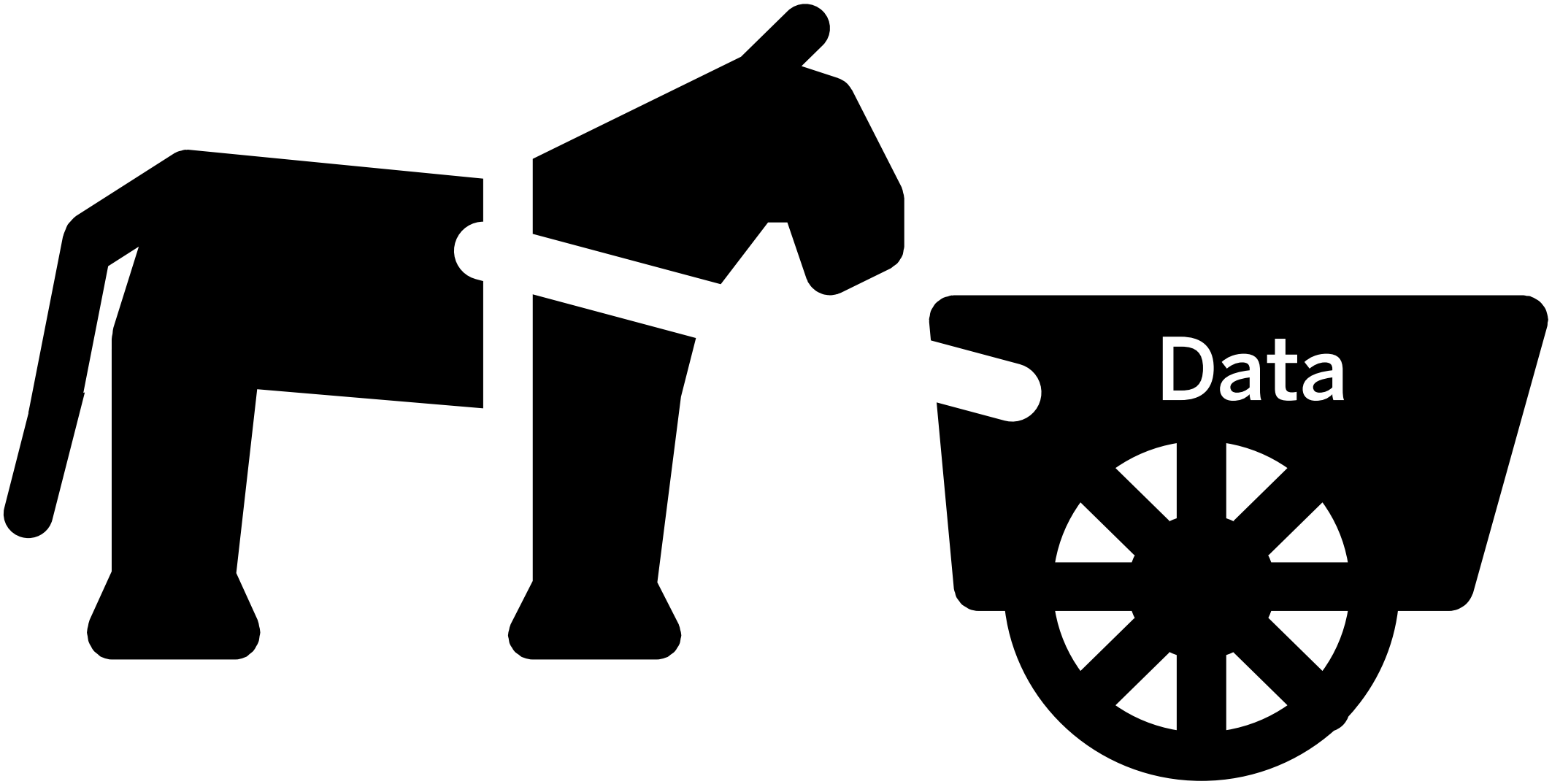
“Quantified Self” Study

by Farzana Dudhwala
University of Oxford


DATA WALL
TRC
DORF
Goal By 10/29
DORF Goals:
TRC Goals:
BOY: P
MOY: R
EOY: S
on grade level
BOOK IT!
READER ROSTER
BOOK IT!
READER ROSTER

Instead of “scores,” which offer teachers little information about what to do next, it is much more **important that formative assessment questions, tasks, and activities provide instructional “insights” about student thinking and about what productive next steps might be taken.** (p. 27)

Shepard, L. A., Penuel, W. R., & Pellegrino, J. W. (2018). Using learning and motivation theories to coherently link formative assessment, grading practices, and large-scale assessment. Educational Measurement: Issues and Practice, 37(1), 21–34. Link


Data

The informational value of assessment items or tasks also matters in terms of the feedback provided to students. It does little good to tell a fourth grader that his essay is a "2" or that he needs three more items correct to reach mastery on a numeracy test. **Feedback is more likely to be beneficial when it helps students see how to improve** (Black & Wiliam, 1998), and this invariably calls for information that is **qualitative rather than quantitative**. (p. 28)

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Measurement: Targeted re-teaching

Assessment cycle:

1. Interim assessment
2. Identify focal topics
3. Targeted re-teaching days
4. Exit ticket

Targeted re-teaching may temporarily increase test scores, but is unlikely to support students' thinking or teacher learning.

Garner, B. (2018). *The epistemic foundations of mathematics teachers' data use: What do the data say?* Paper presented at the 2018 AERA Annual Meeting, New York, NY. Link [handout], Link [AERA]

Students are sorted into binary groups: “got it” or “missed it”

Greta: Topics 7 and 9 are the worst, right? Like 8 is okay?

Coach Diane: Topic 7—there were 290 kids that missed that whole topic.

Greta: That missed all three [questions]?

Coach Diane: Either three or two out of the three.

Greta: Okay. Okay.

Coach Diane: 290. The Focus Topic 8 is what they did best on.

Obvious instructional response: Re-teaching with questions isomorphic to initial assessment

Coach Diane: So, the kids that are getting intervention on Topic 9, what're the rest of the kids gonna do?

Greta: Just have enrichment.

June: How about, you know, that could be a good time maybe to do what you were talking about, some time on Gizmos or something.

Indicator: Analyzing student thinking

Assessment cycle:

1. Interim assessment
2. Identify focal students
3. Collect student work
4. Analyze work
5. Plan instructional response
6. Assessment

Analyzing students' sensemaking supports rich teacher learning opportunities and has potential to support more ambitious and equitable instruction.

Garner, B. (2018). *The epistemic foundations of mathematics teachers' data use: What do the data say?* Paper presented at the 2018 AERA Annual Meeting, New York, NY. Link [handout], Link [AERA]

Centering student sensemaking around content: Bubble kids are likely to show common misconceptions

Mr. Donovan: What about Tommy?

Deanna: I think Tommy got the table...finding the unit rate, but then, when he had to apply it and figure out how much money for seven hours, it was supposed to be $35, and he put $3.05.

....

Deanna: I mean, I think for the most part, he has the concept, but...

Coach Lindsay: Well, but it sounds like he has the procedure for how to find unit rate

...

Deanna: He can't — So, I, I'm gonna say no. It says how much money will he earn in seven hours and he put $3. And if he looks at the table, he should be able to figure out that's not right.

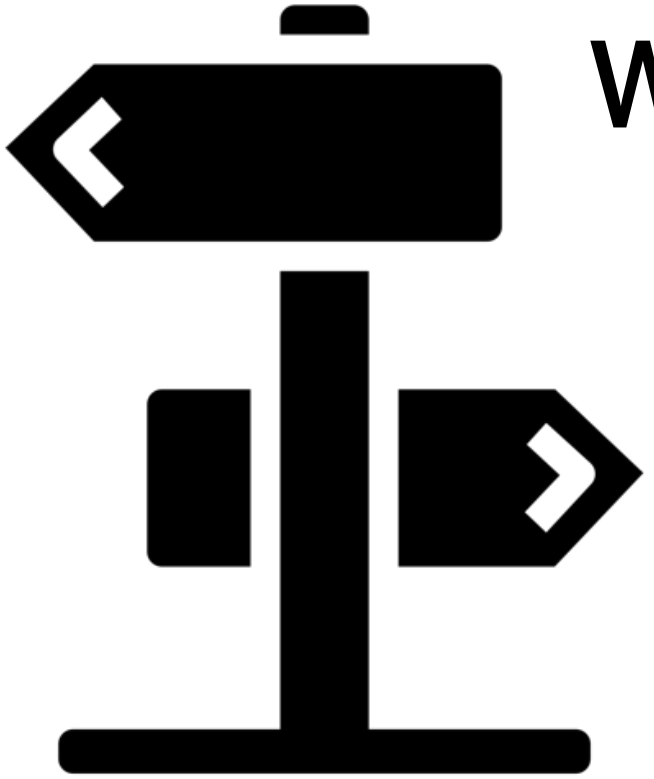
Plan instruction to respond to student thinking:

Coach Lindsay: Okay. So, what are we gonna ask them to get them back on track?

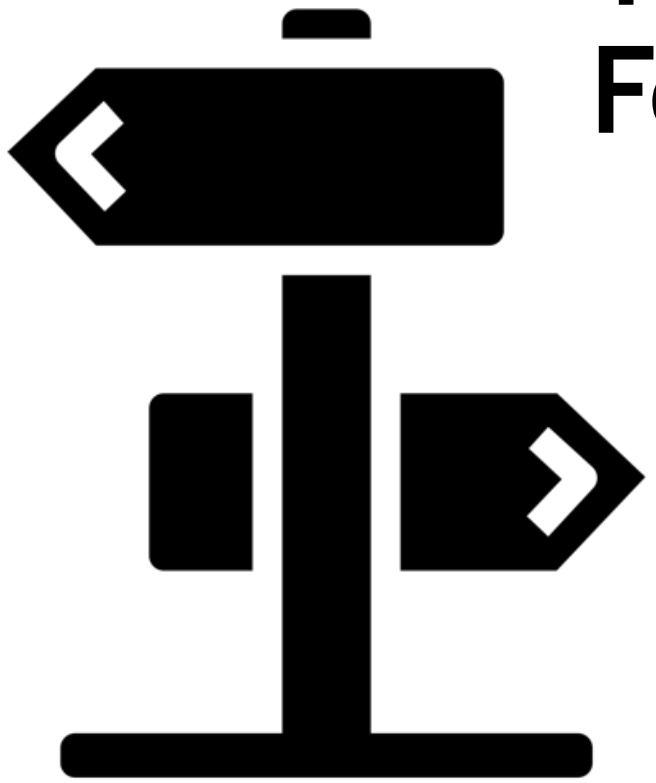
Give students feedback on their work, have them analyze their errors.

Dylan Wiliam – Decision Driven Data Collection Video

from 26:10 to 28:10



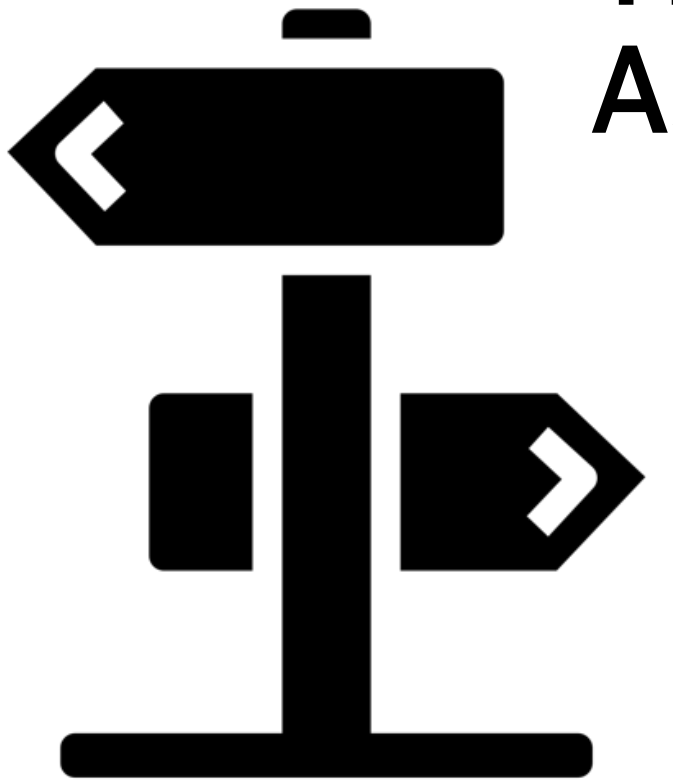
What Educational Decisions?



Three Guiding Questions in Formative Assessment

- Where are we (teacher and student) going?
- What does the student understand now?
- How do we (teacher and student) get to the learning target?

from the *FAME Learning Guide: An introduction to the formative assessment process* by the Michigan Assessment Consortium. Link



Three Formative Assessment Principles

- Assessment is integrated into the process of teaching and learning
- Assessment evidence is used to move learning forward
- Assessment supports student self-regulation

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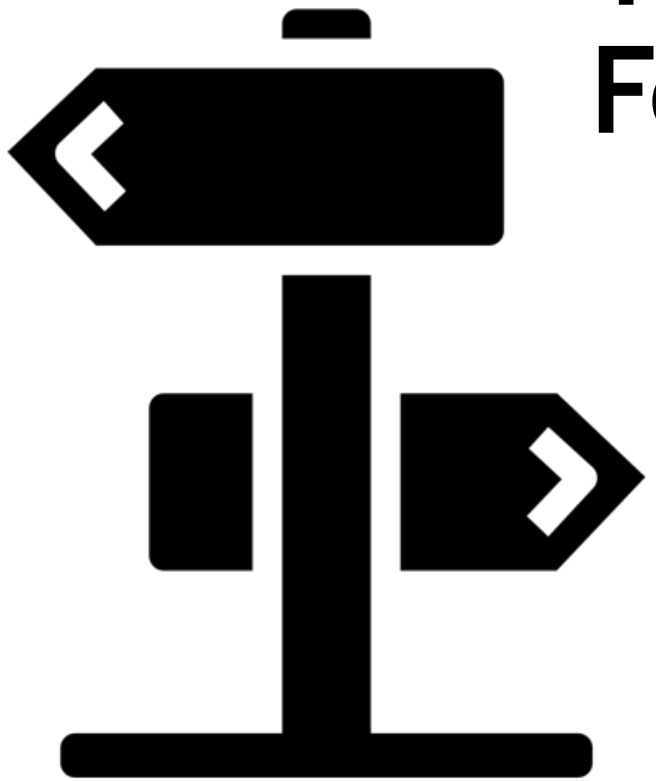
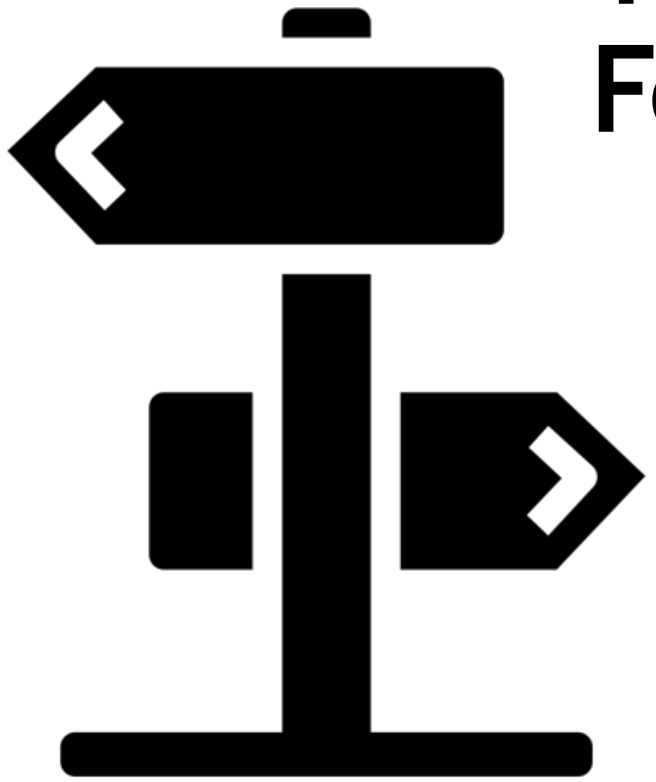


Three Guiding Questions in Formative Assessment

- Where are we (teacher and student) going?
- What does the student understand now?
- **How do we (teacher and student) get to the learning target?**

Formative feedback (from teacher, peers, and self), adjustments to teaching, adjustments to learning

from the *FAME Learning Guide: An introduction to the formative assessment process* by the Michigan Assessment Consortium. Link



Three Guiding Questions in Formative Assessment

- Where are we (teacher and student) going?
- What does the student understand now?
- **How do we (teacher and student) get to the learning target?**

What do we need to reteach?

To whom do we need to reteach it?

Why did students struggle with this?

How do we reteach it?

		Learning About Instruction	
		Weak	Strong
Learning About Students' Thinking	Weak	**Targeted reteaching** • What? • To whom?	**Tips and tricks** • What? • To whom *and how*?
	Strong	**Bounded improvement** • What *and why*? • To whom?	**Responsive revisioning** • What *and why*? • To whom *and how*?

Brasel, J. Garner, B., Kane, B., & Horn, I. (2015). Getting to the why and how. *Educational Leadership, 73.* Link

		Learning About Instruction	
		Weak	Strong
Learning About Students' Thinking	Weak	**Targeted reteaching** • What? • To whom?	
	Strong	In *targeted reteaching*, teachers use data to discuss what to reteach and to whom, but they do not discuss why students struggled with a particular topic or how teachers could teach it differently. Such conversations provide few opportunities for teachers to learn about students' thinking or instructional practices and therefore provide minimal support for improving instruction.	

Targeted Reteaching (Vignette)

SHERRY: So it looks like proportional reasoning was pretty rough. We should go over that again.

JODI: Yeah, I think we have to. Standards 1 and 3 were the worst, right? But I think Standard 2 is probably OK.

COACH ALICIA: There were 290 kids who didn't master Standard 1.

HEWITT: They missed all three questions?

COACH ALICIA: Either three or two out of the three.

SHERRY: OK.

COACH ALICIA: Standard 2 is what they performed the best on. Only a handful of kids missed that.

HEWITT: So let's reteach Standard 1 on Wednesday and Standard 3 on Thursday.

JODI: Sherry, why don't you and I take the kids who didn't master it? Hewitt, you can take the kids who did master it and do an extension activity.

SHERRY: OK, sounds good.

		Learning About Instruction	
		Weak	Strong
Learning About Students' Thinking	Weak		**Tips and tricks** • What? • To whom *and how*?
	Strong		

In *tips and tricks* conversations, teachers use data not only to identify *what* to reteach and *to whom*, but also to discuss *how* to reteach. This approach provides stronger learning opportunities for teachers but is similar to the *targeted reteaching* approach in its weak emphasis on learning about students' thinking.

Brasel, J. Garner, B., Kane, B., & Horn, I. (2015). Getting to the why and how. *Educational Leadership, 73.* Link

Tips and Tricks (Vignette)

SHERRY: So it looks like proportional reasoning was pretty rough. We should go over that again.

JODI: Yeah, I think we have to. Standards 1 and 3 were the worst, right? But I think Standard 2 is probably OK?

COACH BOB: I think so. So Standard 1 is about finding unit rate, and Standard 3 is solving proportions. *How do you want to approach that?*

HEWITT: Hmm. Sherry had a good way for teaching unit rate, right?

SHERRY: I tell my kids to always write a proportion and then use the fish method to solve it.

HEWITT: Yeah, that's good. Kids can remember it easily.

JODI: OK, I'll reteach it that way. Can I borrow your worksheets for that?

SHERRY: Absolutely. I'll run off some copies for you later.

		Learning About Instruction	
		Weak	Strong
Learning About Students' Thinking	Weak		
	Strong	**Bounded improvement** • What *and why*? • To whom?	

Bounded improvement conversations build on the *what* and *to whom* emphasis of targeted reteaching but add the question of *why.* This is an important addition, because teachers' knowledge of students' mathematical thinking is crucial for improving instruction. However, bounded improvement conversations still limit teachers' learning opportunities because they fail to connect this knowledge to future instruction.

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Bounded Improvement (Vignette)

SHERRY: So it looks like proportional reasoning was pretty rough. We should go over that again.

JODI: Yeah, I think we have to. Standards 1 and 3 were the worst, right? But I think Standard 2 is probably OK?

COACH CAROL: Yeah. So *what were the questions that kids struggled with?*

HEWITT: Number 8 was pretty low. It was on comparing unit rates. The one where they had to decide which kid ran the fastest.

COACH CAROL: *Why do you think that was so difficult?*

SHERRY: Well, they might not have remembered to set up a proportion correctly.

COACH CAROL: OK. *Are there any other reasons why it might have been hard for kids?*

HEWITT: It might also have been because the rates don't reduce easily.

JODI: Right. And they might not have realized that they can use a calculator.

SHERRY: Yeah. My kids always struggle with reducing fractions. We should definitely review reducing fractions. Let's hit that hard in our warm-ups next week.

		Learning About Instruction	
		Weak	Strong
Learning About Students' Thinking	Weak	In *responsive revisioning*, the teachers answer all four guiding questions: *what* to reteach, *how* to reteach it, *to whom* it should be retaught, and *why* students struggled with the assessed content. This approach is the most likely to lead to instructional improvement.	
	Strong		**Responsive revisioning** • What *and why*? • To whom *and how*?

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Responsive Revisioning (Vignette)

SHERRY: So it looks like proportional reasoning was pretty rough. We should go over that again.

JODI: Yeah, I think we have to. Standards 1 and 3 were the worst, right? But I think Standard 2 is probably OK?

COACH DUANE: Yeah. *What were the questions kids struggled with?*

HEWITT: Number 8 was pretty low. It was on comparing unit rates. The one where they had to decide which kid ran the fastest.

COACH DUANE: So *what do you think made Number 8 difficult for students?*

SHERRY: Well, they might not have remembered to set up a proportion correctly.

JODI: That might be an issue for some of them, but I also see that a lot of kids picked answer B. I think they might have gotten confused by what the "fastest pace" means—like, maybe they thought it meant who ran the longest. Or they might have divided minutes per miles and then went with the biggest number.

COACH DUANE: So *how do you want to address that?*

HEWITT: Let's do some more work around pace, speed, and distance. Our kids often get confused by those.

JODI: Right. We could give them problems like Number 8 and see what strategies students are using to solve them.

COACH DUANE: Yeah. I have some similar tasks I can give you all. Remember the Orangey problem from last year? Do you remember how that got out their misconceptions? That worked really well.

HEWITT: Oh yeah! In my class, we compared the different strategies. It worked well because they could solve it in whatever way works best for them.

SHERRY: We should rewrite it to include some rates that don't easily reduce so we can see who's still struggling with that.

COACH DUANE: Good idea. How do you think kids will deal with those?

JODI: Well, when I've used those on homework, I see some of them divide distance by time to get speed—like miles per minute. Then they want the biggest number. Sometimes they divide time by distance to get, like, pace—like minutes per mile. Then they'd want the smallest number.

HEWITT: We should make sure to pull out both strategies. See if kids can see how they're related.

COACH DUANE: OK. You might see some other ideas, too. I'll rewrite the Orangey problem and get it out to you.

Getting to the *Why* and *How*

Missing the Why

- What patterns in student responses shed light on how they understood it?
- What makes this problem (or topic) difficult?
- What are some possible sources of confusion on the assessment?
- *If Tips and Tricks are shared:*
  - Why is that teaching strategy a good one?
  - What misconceptions does the teaching strategy address?

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Getting to the *Why* and *How*

Missing the How

- How did you originally teach this content? What worked? What didn't work?
- How can we improve on the original approach to address what did not go well?
- *If teacher is focused on Bounded Improvement:*
  - What are the best strategies for addressing these misconceptions?
  - What curricular resources can we use to address these misconceptions?

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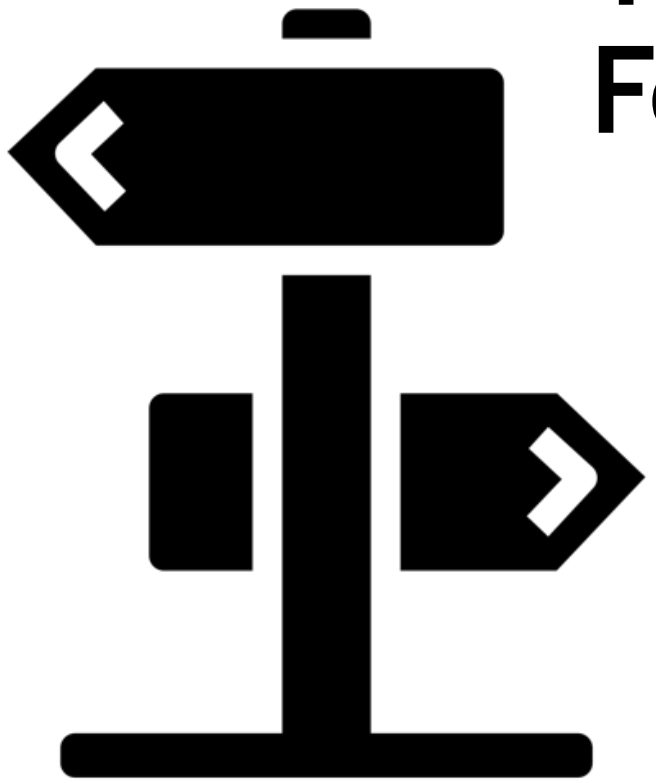

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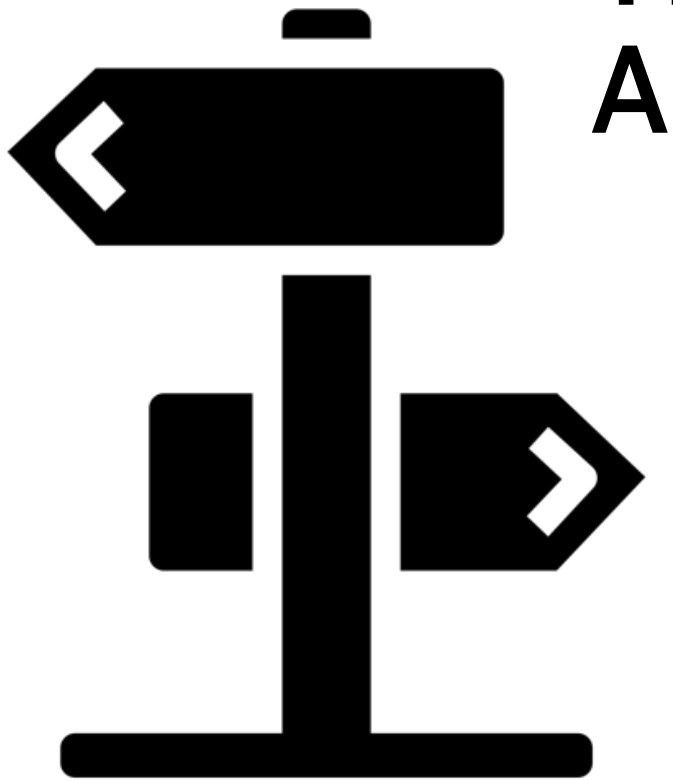

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Decision-Driven Data Collection

- What decisions do you want to make?
- What kind of information do you need to gather to make that decision?
- What kind of assessment design will help you gather that information?

Thank You

Graphics

From The Noun Project

- Running by Eli Kleppe
- dead battery by Mert Güler
- horse and cart by Creaticca Creative Agency
- decision by Andi Nur Abdillah

Data Walls

- Left
- Top-right
- Bottom-right

References

Andrade, H. L., & Heritage, M. (2018). *Using formative assessment to enhance learning, achievement, and academic self-regulation*. New York, NY: Routledge. Link

Dudhwala, F. (2017*). Doing the self: An ethnographic analysis of the 'quantified self'.* Doctoral Thesis. University of Oxford. Link

Brasel, J. Garner, B., Kane, B., & Horn, I. (2015). Getting to the why and how. *Educational Leadership, 73*. Link

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Wiliam, D. (2018). *Formative assessment: Confusions/clarifications/prospects for consensus*. Presentation given at the Assessment in Education: Principles, Policy and Practice 25th Anniversary Conference, University of Oxford, January 2, 2018. Link

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bit.ly/2019alc_handout

Our Website

bit.ly/alliniu

You already have access to high quality resources

- Like this formative assessment self-reflective rubric - https://www.doe.in.gov/sites/default/files/assessment/learning-progression-guided-formative-assessment-self-reflective-rubric.pdf