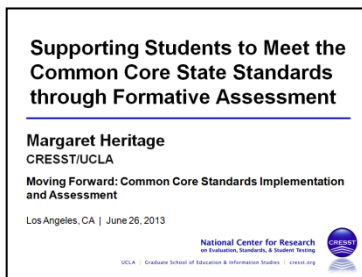


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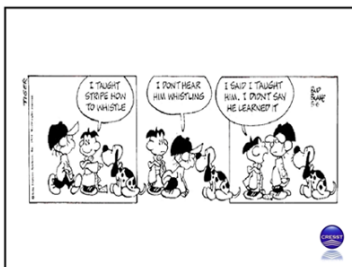
Supporting Students to Meet the Common Core State Standards through Formative Assessment

SPEAKER Margaret Heritage
EVENT TITLE Moving Forward: Common Core State Standards Implementation and Assessment
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MARGARET HERITAGE



Good morning. Good morning. Hello? Yes, hey ... I know, it's not even—I mean, it's beyond wake-up time now so you have no excuse. Well, I'm very pleased to be here to talk about the Common Core and formative assessment, and hopefully to build on what Stanley talked about this morning in his extremely illuminating introduction. And I'm sure Stanley, as you can see, is an expert on many things, so don't feel aggrieved, Stanley, that you're just the keynote and I'm the expert, because you really are the expert.



So I'm beginning with this cartoon, which I hope you can see. The first box says, "I taught Stripe how to whistle." "Well, I don't hear him whistling." "I said I taught him; I didn't say he learned it." And so my focus is going to be on how we make sure that students are learning what we want them to learn; indeed, what we need them to learn to be successful in acquiring the Common Core State Standards. And so my talk this morning ... I'm not going to spend a long time talking about next generation standards and assessment, because Stanley gave such a wonderful overview. But I do want to talk and build on what he said about a balanced

assessment system, and then I want to talk specifically about formative assessment—what it is and what it isn't.

And I have to tell you that I've been working in this area for quite some time, both in the U.K., as you probably hear—and no, this is not a New Jersey accent, and... although sometimes I do get confused as a New Jersey resident, but I'm not, so—and here in the U.S. And there's still quite a bit of confusion about what formative assessment is and what it isn't. So I'm hoping that I can bring some clarity to that area today, and I also want to talk a little bit about supporting teachers with formative assessment—how we do that—and I'll specifically mention how SBAC is planning to do that as well.

So let me start—that's the overview—let me start with this idea of next generation standards and assessment. And I'm calling it *next generation* because, of course, we have the next generation science standards. I don't know what the status of that is in California, but certainly, states around the country are starting to adopt next generation science as well. And we do know, I mean, we've heard from Stanley that there are going to be significant changes ahead. I was very struck when Stanley asked the question about how many teachers in your schools are teaching in the way that those specific items demand, and a quick read showed that most people felt that that wasn't current practice in their schools. Is that fair? Yep.

So we've got to get ... and I'm going to be doing a session after this, a breakout session, on the shifts in the Common Core and supporting those instructionally, but if we look at the ... and this is taken from the Common Core documents, that they include rigorous content and application of knowledge through higher order skills. And as we saw through those assessment items, it's the application of knowledge and higher order thinking. And they're also informed by top-performing countries, so that all students are prepared to succeed in our global economy and society.


And if you've ever ... have you ever heard Andreas Schliecher talk? He's the guy from the OECD who does the analysis of the PISA and PIRL. Have you ever heard him talk? If you ever get a chance, it's worth it. His slides are to die for. But in terms of the U.S. performance relative to other countries, this has been a spur for the Common Core—to shore up American students and make sure, not only are they college and career ready here in the U.S., but they're also internationally competitive.

And the whole point, as you heard from Stanley, is that we're really going for deeper learning. I'm sure you've heard the criticism that Bill Schmidt leveled, particularly at the math curriculum in the U.S., that it's a mile wide and an inch deep. Remember that—mile wide and inch deep? The Common Core is moving us from that, quite significantly, to curricula that is deep, that demands deep learning, and I think you saw that exemplified in Stanley's tasks—or the SBAC stuff, tasks ... I shouldn't call it Stanley's—that we want students to really... less is more; that they are more focused on important content which is going to equip them to be college and career ready, and we want them to go a lot deeper. And so instruction is going to have to shift accordingly.

Emphases in Math CCSS

- Balance conceptual **understanding** and procedural fluency
- **Connect** these two types of knowledge
- Maintain **high cognitive demand**
- **Communicate reasoning** about concepts
- Engage students in mathematical practices:
 - **Reason** abstractly and quantitatively
 - **Construct** viable arguments and critique the reasoning of others

(Maschke et al., 2012)




So I know you spent the day yesterday talking about the shifts in the Common Core, but just to remind us, the ELA standards have a very strong emphasis on critical thinking and being able to argue from evidence and evaluate the arguments of others. One editorial comment (if you could just switch the video off for a second) is that I wish the Common Core had said something about learning to like reading, don't you? I mean, let's not lose that in our schools. That ... you know, when I grew up as a teacher and especially a reading teacher, that's what I wanted kids to do—to enjoy reading. I hope we're not going to lose that in the Common Core. So just as a little aside, we need to make sure that's still one of our goals, even though it's not called out specifically.

Emphases in NGSS, cont.

- **Using** mathematics and computational **thinking**
- **Constructing** explanations (for science) and **developing** designs (for engineering)
- **Engaging in argument** from evidence
- Obtaining, **evaluating** and **communicating** information

(Quinn, Lee & Valdez, 2012)




The math standards place strong emphasis on students' ability to use their knowledge to solve problems. So arguing from evidence, and using knowledge to solve problems, and balancing conceptual understanding and procedural fluency—not an either/or, but a balance. Now a colleague of mine at CRESST; in fact, two colleagues, Joan Herman and Bob Linn, recently did a review of the Smarter Balanced and the PARCC, you know, the other testing consortium which the rest of the country is going with. They did a review of the test items and the tasks that are made available through Smarter Balanced, and they found, and I think we saw that in the examples this morning, that a large proportion of the items will assess deep learning.

Depth of Knowledge

- DOK1: Recall of a fact, term, concept, or procedure; basic comprehension.
- DOK2: Application of concepts and/or procedures involving some mental processing.
- DOK3: Applications requiring abstract thinking, reasoning, and/or more complex inferences.
- DOK4: Extended analysis or investigation that requires synthesis and analysis across multiple contexts and non-routine applications.

(Webb et al., 2005)



Now, just to remind you, deep learning and the depth of knowledge—Norm Webb and colleagues—DOK 1 (Depth-of-Knowledge 1, the recall of facts) ... Stanley showed you some

items; DOK 2, the application of concepts and/or procedures involving some mental processing; DOK 3, the applications requiring abstract thinking, reasoning, and/or more complex inferences; and then DOK 4, extended analysis or investigation that requires synthesis and analysis across multiple contexts and non-routine applications. Now, I want you to pay attention specifically to DOK 3 and 4.

Now, I don't know how many of you...and I don't even know if California was included in this study, but RAND produced a study—you know, the RAND organization—they produced the study of assessment items on 17 states' tests. This is pre-Common Core. And these 17 states were states that had represented themselves as having items with high levels of DOK.

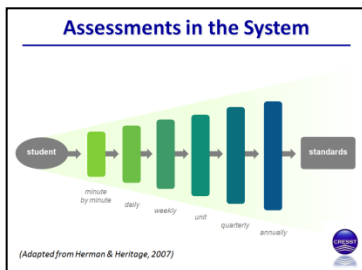
Assessment for Deeper Learning

- Specifications for test items and tasks suggest a large proportion of items will measure deeper learning
 - Mathematics:
 - 49% DOK3
 - 21% DOK4
 - ELA:
 - 43% DOK3
 - 25% DOK4

(Herman & Linn, 2013)

Guess how many items in these state tests they found at DOK 3 and 4, as a percentage? Zero. Guess how many ELA, percentage of ELA at DOK 3 and 4? A bit more, a bit more than that, about 7% or 8%. So that, I think, indicates to you what Stanley was talking about this morning—that we are really notching up what we're expecting of our students through the Common Core and through tests. And when Joan Herman and Bob Linn—and this paper is available on the CRESST website, and I do recommend you look at it because it's really interesting, not only what they found, but in terms of explaining the Smarter Balanced methodologies, as well, in terms of assessment design—and what they found is, through the specifications of the test items and tasks, a large proportion of items will measure deeper learning. So mathematics, 49% DOK 3 and 21% DOK 4; ELA, 43% DOK 3, 25% DOK 4. So that is going to be a big difference.

So in terms of what is required from our teachers, what I want to argue next is that if we're going to support deep learning, then we are going to have to have skilled teachers who can engage in successful formative assessment. And I want to argue to you this morning that formative assessment is one way, and in fact a major way, we can help students move to deeper learning and make sure they're on track to meet the Common Core goals.

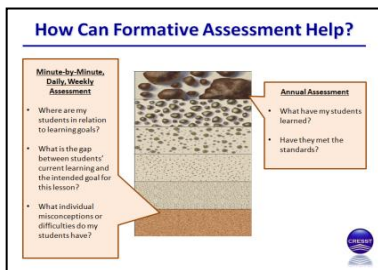


So let me now talk a little bit about formative assessment, and I want to begin... you know, Stanley talked about a balanced assessment system. And I want to present to you some work

that Joan Herman, my colleague at CRESST, and I put together a while ago, and it has been adapted since with this idea of assessments in the system. So that we start with the student, and then we had those minute-by-minute assessments, the daily, the weekly, the unit assessment, a quarterly assessment, and the annual assessment. And so what you can see from this...I mean, talk to your neighbor, quickly, about where you see formative assessment in this; where is formative assessment in the balanced assessment system? Tell your neighbor what you think, but be sure to stop talking when I ask you, OK? And I have been a school principal, so I can silence this room, just so you know.

[Audience discussion]

MARGARET HERITAGE

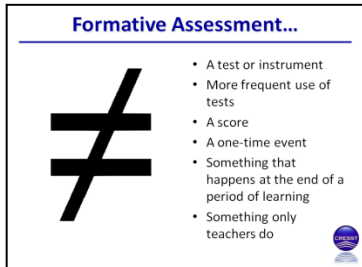


Okay, so please cease your conversation. Thank you. In my book, formative assessment is here, very proximate to student learning, and we will talk about why later. But it's the way that teachers gather evidence and act on it that's proximate; i.e., really close to the student learning. This is further away from the student learning, the annual assessments. They sample the learning that's taken place over the course of the year. But here, the minute by minute, the daily, and even the weekly—that is where the formative assessment occurs, at that level. Unit assessment can be formative if it's given before the end of the unit, so there is still some time to do something about it. And then the quarterly—the Smarter Balanced is producing optional interim assessments, which districts can opt into or not, and then the annual state test.

And notice here that this is the progression towards the standard. So each assessment has a slice of learning toward the standards. So here, with the very proximate assessment to student learning, it's going to be much more fine-grained. You want to keep track of how student learning is developing in the course of a lesson, or how students' learning is developing in the course of several lessons. So it's difference in grain size, and length of teaching and learning covered. And what I want to argue today is the importance of this end of the continuum in making sure that student learning is on track to meeting the standards. We cannot wait six weeks or longer to figure out if student learning is on track; because if it isn't, what happens? They have missed the boat; it's too late; we have got to move on.

So we can't be in the business of constant remediating students, and remember what Stanley said about the demand, particularly for strugglers, struggling students, students with disabilities, ELs. We have got to be on top of their learning as that learning is developing. So if you think about this—and I think this is a useful way to think about a balanced assessment

system—it’s not good or bad. It’s assessment for different purposes for different decisions. And these assessment purposes here are intended to figure out where students are *while*—remember, *while* they are learning, not when they have done it; did they get it or didn’t [get] it, but *while* they are in the course of learning.

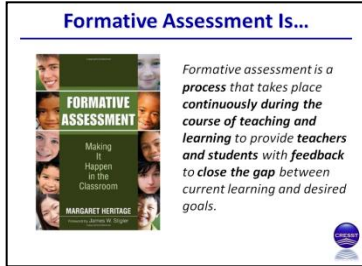


So that leads me to this idea of what formative assessment is **not**. First of all, it’s not a test or an instrument. People say, “Formative assessment; there’s no such thing as a formative assessment. Yeah, you might use assessment for formative purposes the same way as you might use it for summative purposes, but there is no such thing. It’s not a specific test.” Some people think formative assessment is giving more quizzes. No, it’s not about that. It’s not about giving a **score**. And I will say later, if we want this deep learning, we have to have assessment that’s going to give us substantive insights into student learning.

A score might tell you what level a kid has achieved, but it doesn’t tell you *why* they have achieved it; or if they haven’t achieved what you had hoped them to achieve, why they haven’t achieved it. We need to be focusing much more on learning as it is in the course of developing. It’s not something that happens at the end of a period of learning. Sure, an assessment that’s a benchmark, after a quarter, can be used formatively if you do something with it, but it’s not formative assessment as described in the literature. And there is quite a big literature on formative assessment—that when it’s applied effectively, it works.

And in the literature, formative assessment is not just something that teachers do; students are involved in the process. And I think if we are really serious about college and career ready, we have to have kids that can learn for themselves; that they know how to learn. I think that’s inherent in the standards; I just wish it was called out more. But I think if you really examine the standards, you will see that learning how to learn is going to be one of the core areas of learning for our students.

So this might not square with what you came in thinking about formative assessment, and I want to go a little bit further, as I do want to stress that what I’m talking about is based on research. This isn’t Margaret Heritage standing up with a cool idea. Yeah, it is a cool idea, of course, but it’s based in research, and I’m not going to spend hours and hours going over the research, because actually you can read my book if you want to. In fact, I’m going to show you another book I just wrote so you can read that, as well.

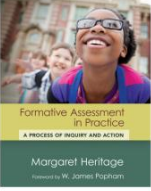


So this is a definition I've used, and it's very consistent with a lot of other definitions. One of the other hats I wear is I lead a state collaborative under the Council of Chief State School Officers, on formative assessment for students and teachers, and they came up with a definition six years ago, which you may have seen; it's been widely cited nationally. And this is very consistent with that and other definitions.

So what do you notice here? First of all, it's a *process*, or a set of practices. It's not a thing; it's not a one-time event. It takes place continuously during the course of teaching and learning; not at the end of, but during. And it provides teachers, and notice who else—students—teachers and students, because teachers and students are together in this process. And it provides them with feedback to close the gap between current learning and desired goals. So let's just look at that again. It's a process, not a thing. It takes place continuously, hence the minute-by-minute, day-by-day, week-by-week. If you've gone longer than a week and you don't know where your kids are, then I suggest you need to get focused on what they have learned that week, and what they haven't learned, and what you need to do next. So that's the feedback that teachers get, and students also get feedback from their self-assessment to close the gap. Now I'm not talking about the achievement gap of No Child Left Behind. When you start to learn something, okay, this is your starting place. If you're going to learn something, you're going to set a goal. You're all educators, you know that you don't set a goal over here, and you don't set a goal over here; it's manageable. What is there between where I am and where I want to be, say, at the end of the lesson? Look at my hands; look at what's on the...this is DOK 1—a gap. My job is to close that gap, as a teacher. I'm setting my lesson goal maybe two, three periods. My kids are here; I want them to be here. I want them to have learned something; maybe looking back to that how to organize an argument, or how to organize information. Maybe I'm working on how to organize information. Kids aren't going to learn how to organize information immediately. It's going to take some time. So I want to make sure that I'm paying attention to how my instruction and student learning is moving toward meeting that goal.

What happens when I meet that goal? I sit back, paint my nails? Nope; another gap. So this idea of closing the gap, and that's core. That comes in the work of Royce Sadler, who wrote the seminal paper in 1989. It's completely foundational to the field, and he claimed the term "the gap" between where you are and where you want to be. Remember, short term; proximal to learning. I also wrote another book just recently, and I have embraced this idea of a children's rights approach to assessment. This isn't my idea; it comes from some scholars actually in the U.K., but I've adopted it and thought about it in terms of formative assessment.

A Children's Rights Approach




- Assessment in the best interest of all students
- Opportunities to learn, progress, and succeed available to all children equally
- Students involved in the decisions that ensue from assessment use

So we need to have assessment that's in the best interest of the children. What's an assessment that's in the best interest of the children? In my book, it's figuring out where kids are so you can help them move forward. It's figuring out where kids are while they're learning, so they don't end up somewhere off track and having to be remediated. It's about figuring out where students are so that every child has the opportunity to learn, progress, and succeed equally. That doesn't mean to say they're all going to get the same diet, but equally. So my super, super smart, gifted student needs to have the opportunity to progress in the same way that my really, really struggling kids have the right to progress, and everybody in between, which means focusing on the individuals. It doesn't mean to say you're going to do one-on-one teaching, but it's paying attention to individuals.

And then students are involved in the decisions that come from assessment use. At the end of the day, we can help students learn, but we can't do the learning for them. They're the ones that learn, not us. They need to do the learning. And so if students are not involved in this assessment-to-learning process, then you really are missing half of the equation, because they must be involved not only to be college and career ready and learn how to learn, but to be successful in meeting the standards, and I'll say a bit more about that in a second.

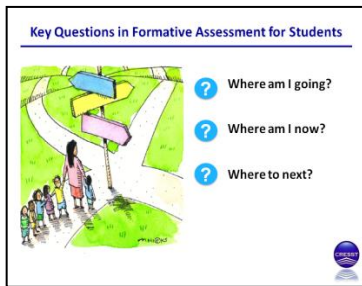
Key Questions in Formative Assessment for Teachers



- ? Where is the learner going?
- ? Where is the learner now?
- ? Where to next?

So I've talked about keeping kids on track, and there are three key questions—and this is a framework that has been put forward by several researchers, and I've used it, and a lot of other people around the country use it, in terms of key questions for teachers. The first is, where is the learner going? What do I want my kids to learn? Why have we all shown up in this classroom today? Not what I want kids to *do*; what do I want them to *learn*? And we're going to have to get really good at figuring out that deep learning from the Common Core—what is it I want them to learn? Now I've worked with teachers across the world, and I have to say that this is hard for teachers. You know why? Because they tend to focus on what kids are going to *do*, and then you ask them, "Well, why are they doing that?" And that's a harder question.

So I would submit to you that if you're a supporter of teachers, which I am assuming you are, that's why you're here, then one of your roles would be to help teachers focus on that learning—what is it I want students to learn? Then, where is the learner now? Okay, I know I want my students to learn, I've got a bang-up lesson, I think it's going to support deep learning. I'm not going to get to the end of the lesson, though, without figuring out where my students are. They may have a misconception; I may have confused them, or they may be right where I want them to be, but I've got to figure out how that learning is developing.



And if it's deep learning, which is what we're going for here, it's not just about learning a few facts and testing them on them; it's not just about learning a few computation skills and giving them 50 problems. It's about learning deeply, which takes time, and teachers need to know where the students are. And then the key—remember that children's rights idea—where are my students, and then what do I do next to help them progress so they do meet those standards? So, these three questions for teachers. However, remember I said who else was involved in formative assessment? Students. So the students have the same three questions. Where am I going? Students need to understand what they're learning, and why they're learning it. We heard Stanley say that older kids will say, "Well, why am I doing this? Like, why the heck am I learning algebra?" Good question. Where am I going? What is my goal? What am I supposed to learn here? Where am I now?

We cannot have students in our classrooms who sit there as learned helplessness. Our students have to be aware of where they are now—am I learning what my teacher thinks I should be learning? So we will need to have students involved in some kind of self-assessment. Am I learning what my teacher wants me to learn, and then where do I go next; what do I do? Remember, that's part of being a lifelong learner, that I can manage my own learning. So with that said, then, do those three questions make sense to you in terms of a frame for formative assessment—where am I going, where am I now, where to next?

So how can formative assessment help in all of this? Well, we know that—we saw the cone with the annual assessments of the end of the year, sampling a year's worth of learning. So that's a large grain size. You can't sample every single thing that kids learn, but you can get those big hot-ticket items that you want students to learn. And in terms of formative assessment, where we're looking at that area that's much more proximate to student learning, the minute-by-minute, the daily, and weekly. So I have to figure out ... I've planned my instruction, I've planned the learning experiences, so where are my students now in relation to this learning goal? 15 minutes into the lesson; where are they? 30 minutes into the lesson; the end of the lesson?

I have to decide when I need to collect that evidence. What's the gap? Because remember, if it's deep learning, they're not going to go from here to here just like that. They may be developing a concept that they've got a partial understanding; it's fragmentary, it's a misunderstanding. I need to figure out how they're thinking. I need to get inside their heads to the best I can. And then what's the gap between where they are and where I want them to go, and are there any misconceptions or particular difficulties the kids are having that I can address there and then? So it's this idea of keeping on top; collecting evidence and keeping on top of learning as it is developing.

And so as I said earlier, what we need is not scores. This is not my language; this is Lorrie Shepard, measurement expert, and she talks about ... quit looking at the numbers, okay, just quit looking at the numbers. What we have to do is get inside kids' heads. Now wouldn't it be nice—and I'll probably be dead and gone, but some of you might be young enough so that when we have all this imaging, this brain imaging, we won't give computer adaptive tests, we'll just stick something on the kid and see what the brain activity is. But until we can do that, we have to try to have kids externalize what's in their heads, how they're thinking, so we can work with them. So getting these substantive insights to support deep learning.

And you're probably familiar with the term *assessment for learning*. You heard that? So formative assessment in other parts of the world is called *assessment for learning*, whereas assessment for summative purposes tends to be called *assessment of learning*. So the idea of formative assessment is that you are going to assist learners to make sure they get to where you want them to be. And assessment to assist learning has to have as its starting point where kids already are, where they've got to; not where you think they should have got to, or not what's in the end of the chapter test. But where are they, and how do I help them move forward.



Now the reason I'm showing you this ... anybody have any ideas why I'm showing you this? It's a Rembrandt drawing, just to keep the art theme going from Stanley, Picasso to Rembrandt. Why do you think I'm showing you this? Any ideas? Somebody shout out.

PARTICIPANT

Well, the adult is pointing where the child should go.

MARGARET HERITAGE

Excellent. The adult is pointing forward. This is the direction, okay? This is where you need to go. Why else am I showing it to you?

PARTICIPANT

It's a work in progress.

MARGARET HERITAGE

It's a work in progress. What's the child trying to do? Walk. We know learning to walk takes time. Why else am I showing it to you? Glad you came this morning, sir.

PARTICIPANT

[inaudible]

MARGARET HERITAGE

Yeah, I hadn't thought of it that way, but it's a draft; it's not fully complete.

PARTICIPANT

[inaudible]

MARGARET HERITAGE

Exactly right, they are down at the child's level.

PARTICIPANT

It's also taking more than one adult to guide that child.

MARGARET HERITAGE

That's nice. I hadn't thought of that either. So yeah, that's a great sort of—it takes a village, or at least takes two. But the adult is bending down to the child's level. They're not standing up and showing the kid how to walk—now do this—but it's contingent on where the kid is. That's the kind of instruction we need in our classrooms if we're going to get deep learning and meeting the Common Core. It's got to be contingent on where the students are. And in order to be contingent, we've got to figure out where are they in understanding this deep concept, or acquiring these deep skills, or this deep knowledge. It takes time, and it's going to be incremental, and we better figure out where the kids are.

So that's why I showed you this, pointing the way forward. We had some very nice examples, and coming to the child's level, and being formed as a preliminary sketch, and then the last comment about it takes more than one. And I think that's a really good point, because if teachers are going to be successful with the Common Core, and, indeed, formative assessment,

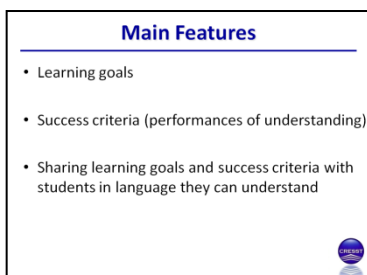
then I would argue that it's going to take a lot of collaboration. That's at least what we have seen out in the field in the areas where we have been doing this work.



So more support for formative assessment has just come from the National Research Council and National Academy's press publication. And remember, one of Stanley's bullets was transference. We want kids to be able to transfer what they learn into other contexts; that's part of what deep learning entails. And look what they said: "Ongoing formative assessment by teachers can provide guidance to students, which supports and extends their learning, encouraging deeper learning and the development of transferable competencies."

Now you could have substituted words and said the Common Core is intended to encourage deeper learning and the development of transferable competencies. So this just came out, and there's a lot in it about formative assessment, encouraging deep learning in 21st century skills. If you haven't looked at it, I suggest it's very readable, and I think it's an important book. So we have support for the idea of ongoing formative assessment; and again, they use the term ongoing—not periodic, or when I feel like it, formative assessment, but ongoing—by teachers; can provide guidance to students, supports and extends their learning to encourage deeper learning and the development of transferable competences.

So, it's not a test; it's not a one-time event. It's something that happens which engages teachers and students in the process of learning and meeting those proximate learning goals so that kids don't get left behind. Why would teachers not engage in formative assessment if that's what it does? That's a rhetorical question. If you're scratching your head thinking, what's the answer to that one, that's rhetorical. So having said all that, I wanted to go a little bit deeper now into what constitutes formative assessment. And remember, and I keep stressing this because I think sometimes people think, well, this is just a cool idea that's just come in, and, you know, this time will pass. Well, it may pass, but I hope it doesn't, because other top-performing countries in the world—I shouldn't even say other, because we're not top performing—top-performing countries in the world have well-developed systems of formative assessment, or assessment for learning.



So what are these main features, then? Well, the first thing is—remember what I said—Where am I going? Learning goals, learning targets. What is it that I am going to learn? Why did we all show up today in this classroom? What are we going to learn? And then, and Stanley talked about, what are these performances of understanding? So if I want my kids to learn this, how will I know if they’ve learned it? What will those performances of understanding be? And in the formative assessment world, they’re called success criteria. Is this a familiar ... or criteria for success, is this a familiar term to you?

I see some people nodding, other people looking completely blank, like what the heck is she talking about. No? Okay, so the teacher identifies a learning goal, then the performances of understanding. But remember that the students have to be involved in formative assessment for it really to be a process of formative assessment. So they need to know what those learning goals are, and they also need to know how they will know if they’re learning it. So in really effective formative assessment classrooms, you will see the teachers spending quite a chunk of a lesson—which could be three, four periods—talking about what is it that we’re going to learn, and then sharing examples of what that learning looks like. So learning shouldn’t be a secret. Kids should have a sense of what is the quality that I’m going for, so they can be engaged in the learning, and they can monitor their own learning.


Learning Goal

BIG IDEAS:
- DNA is a warehouse of the genetic code that provides information that controls cellular structure and activities.

PRIOR KNOWLEDGE:
Proteins are macromolecules made of specific sequences of amino acids (**structure**). Proteins have many **functions** that control cellular structure and activities.

LEARNING GOAL: Understand how the **structure** of DNA **relates** to its function.


TIME: Three blocks of 90 minutes.



So I want to show you a science learning goal from a high school teacher that I worked with fairly recently, and this is how he set up his thinking. So he has got time blocks of 90 minutes, and his big idea from science is—I wish I could read what it says on my computer—that “DNA is a warehouse of the genetic code that” ... well, you can probably read it better than I can, but let me read it ... “that provides information that ... what? ... controls cellular structure and activities.” You can see how much I know about DNA, can’t you? I can’t even do a cloze procedure. So prior knowledge, that’s the prior knowledge the students will need. And so he will be assessing to make sure they have that prior knowledge, and then his learning goals; he wants the kids to understand how the structure of DNA relates to the function. And he has allocated his three blocks of 90 minutes for this particular lesson.

Success Criteria

- Define the terms structure and function
- Describe the structure of DNA
- Explain why the base pair rule means that DNA forms complementary strands and a double helix
- Demonstrate the processes of transcription and translation
- Explain how a mutation may or may not alter the function of a protein



Okay, so beginning of the lesson, he is going to discuss all these with the students, but he also has specific criteria, and these aren't all of them, but he unfolds these. So the first thing he wants them to be able to do is define the terms *structure* and *function*. Then he wants them to be able to describe the structure of DNA. Explain why the base pair rule means that DNA forms complementary strands in a double helix. Demonstrate the process of transcription and translation, and explain how a mutation may or may not alter the function of a protein.

So he has listed a number of criteria by which he will judge if his students are meeting the goals he has established. He is going to use this, use these criteria to collect evidence as these lessons unfold, and the students also know what it is they're expected to be able to do. So if I'm going along in the lesson, I think, "Oh, my job is to be able to describe the structure of DNA. Now can I do that? If I can't, what do I do about it?" I have to figure out some internal resources that I can deploy to figure that out. So the learning goals and success criteria. The next thing is, once I've got those ... and I've got to elicit evidence of learning while it's taking place during a lesson, and there's no one way to elicit evidence.

An Australian called Patrick Griffin talks about eliciting evidence through what students say, make, do, or write. And that's a good way to think about it. So if we go back to this here, you will see, describe the structure of DNA. OK, so kids have to have the opportunity to either orally give descriptions or write descriptions. Explain why the base pair rules; demonstrate. So these success criteria will lead to opportunities for students to be able to show their performances of understanding. So there is no one single way. And then teachers, during the lesson for the next day, the subsequent lesson, or subsequent period rather, can think about, "What do I do? Are my kids with me? So do I need to make any instructional adjustments, or shall I keep on going with what I have planned?" So it's informing a decision.

We can't have teachers just going through lessons without making informed decisions about where kids are in their learning, and then what they do about them; not if we're going to meet Common Core and attain that deep learning. Now I'm going to show you an example of eliciting evidence from—it's a third-grade classroom in Syracuse, New York. This is an implementation I did with New York State a while back. And look at how this teacher is collecting evidence, and then I want you to pay attention to what the teachers at end of the video say.

[Video clip]

(Kids talking)

That's correct.

Teacher: What column did you put that last one?

Students: This one?

Teacher: Yes.

Student: We put in; I know it and I proved it.

Teacher: Can you tell me how you proved that?

Students: Well, we showed our work. By adding numbers at the bottom. We showed our work because how we put $5+1$. We showed our work by getting ... but I mean multiplying.

Teacher: Do you guys have any questions for your teacher or are you sure about that one?

Students: We're sure. We're sure about that one because if we add ... times these three (inaudible) and if we have = sign, $5+1=6$. So we showed our work on ... (Overlapping) Yes. If there are two different numbers, if they equal the same number, it would still be equal.

Teacher: Before you go on, could you tell me about this column here on the right, this problem?

Students: They don't understand it. We don't understand it; we're confused. They don't understand what ...

Teacher: Could you tell me what don't you understand? Is there something you need help with that you read in the problem, or you're not sure what to do?

Student: She keep on saying that we need to add two 4s, so she is making us unsure, so that's why ... but see how when we put five circles, because it said divide by 5, and I asked her, where does she get the number 35 and 25 from, and we are not supposed ... she don't know if we're supposed to divide 35 with it.

Teacher: So you guys have said, for this one you need a teacher to help you, right?

Student: Yeah.

Teacher: Thank you.

(Other teachers commenting on teacher/student interaction just observed)

Teacher 1: Still lets us very quickly see, these are the type of problems they are still struggling with. We need to adjust our teaching, but they were able to tell us that instead of us giving an assessment, and we seeing it.

Teacher 2: And we also could look at that, and see that not all kids were struggling in the same area. We could use that piece of information and see specifically what kids were struggling in what area, and intervene on what they needed, instead of reteaching everyone working in a whole group setting, and kids who already knew it, or they didn't have that misconception, weren't getting retaught it, or teaching something that they didn't need. And then it was a quick fix. They could meet in small groups, you could meet one-on-one, or you can even have a peer teach them if you had to, but using that piece to guide your instruction following that.

[End of video clip]

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So you saw those teachers using an eliciting activity, an evidence-listing activity, and go back to Stanley's examples of SBAC, you know, having kids solve the problem, show their work,

explain; very similar. And then notice what those teachers said, it's a quick fix, because going back to my Rembrandt drawing, you're meeting the students where they are. Those teachers completely changed how they operate in the classroom. The first time I met with them, it was in a professional development meeting and they were sitting with hands, arms folded like this. Well, you know what that means, when you go into professional development sessions and they've got their arms folded, right? And look how far they've come. And that was an inclusion classroom, and they were talking about *all* their kids moving forward, because it was a quick fix. You're meeting the student where they are, and that's what I meant by the individual aspect.

So then providing feedback that moves learning forward, and the involvement of students through the use of teachers' feedback, peer assessment, and self-assessment, and the whole idea of formative assessment; it's not an add-on. When teachers say, "Well, I haven't got time to do any more assessment," the idea of, this is part of your instruction. I mean those kids were doing an assessment task, but it was actually an instructional task as well, working together. So I'm going to show you another video, and this is actually from California, not too far away. This is a school very near Skid Row in downtown Los Angeles, and I want you to notice what this teacher is doing with this student. I'm going to remind you—providing feedback, involvement of students, and integrated into instruction. So this is a 5th grade writing session.

[Video clip]

Teacher: MacKenzie, what are you working on?

Student: I'm working on my final draft, I want to make a final sentence, and I wanted your feedback.

Teacher: Okay. So do we have our success criteria here, our checklist?

Student: Yes.

Teacher: What are you looking at right now? What are you focusing on? Are you focusing on punctuation; are you focusing on grammar?

Student: I'm focusing on this one.

Teacher: Oh, clarity. So you are asking yourself if this is going to make sense to somebody who had no idea. So what do you think so far?

Student: I don't know if I ... because I started with two questions, and then I ended with a period, and then I started another question.

Teacher: I see. So let's read it and see if that makes sense?

Student: It says, "The world has been taken by trash. What are you willing to do to save our earth?"

Teacher: Okay. So let's go back to your original concern. So you're concerned about having two questions at the beginning. Well, the question that you have here at the beginning, "I wonder why people don't pick the trash up." Well, you're following that up with what? What is this, "People may argue that"—what is that?

Student: That's a counter-argument.

Teacher: That's a counter-argument. So this question "I wonder why people don't pick up trash ..."

Student: It's connected to my counter-argument.

Teacher: It's connected to your counter-argument. So it makes sense, okay? So what's the other question that you feel maybe ...?

Student: I was going to put right here after "about 33 million people don't care about the earth," I was going to put "I wonder why they don't care," and then I was going to put this one.

Teacher: Oh, I see.

Student: And I wanted to know if that was okay, to put two questions and a question, period, another question.

Teacher: Well, I think that "I wonder why they don't care" and "I wonder why people don't pick up trash..."—it's connected; it's connected. So is there a way that you think that maybe you can combine those two into one, so that you don't have two questions back to back?

Student: Yeah.

Teacher: So can you think about that, because "I wonder why they don't care" and "I wonder why people don't pick up trash ..."

Student: ... are the same.

Teacher: ... are connected to each other. So you can definitely think about connecting those two, so that it's one question, but that has those two things, those two components that you wanted to make sure that were in there.

Student: Okay.

Teacher: Okay. So go ahead and think about how you can do that.

(Voice: Angelica is a very bright and motivated ...)

[End of video clip]

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So what did you see going on there?

PARTICIPANT

Language.

MARGARET HERITAGE

Language.

PARTICIPANT

A lot of questions.

MARGARET HERITAGE

Questions.

PARTICIPANT

Academic language.

MARGARET HERITAGE

Academic language. This is way before the Common Core, by the way, and they're talking about argument and counter-arguments. Do you notice they are using that? What did you hear that kid say in the very beginning? I nearly passed out when I was in that classroom. Did you hear what she said? "I'd like to get your feedback." Wouldn't we love every fifth grader in California to be asking their teacher, "I'd like to get your feedback?" Wouldn't we love every fifth grader in California to know, to be monitoring and assessing their work, and be figuring out what it is that they need feedback on? She wasn't sure if she was focusing on clarity. She got her checklist, she got her criteria, she's focusing on clarity, and she wants the teacher feedback.

What's happening here? Remember, the student involvement, so we have the student involved there with getting feedback. And notice, and crucially, the teacher didn't tell her what to do. The teacher didn't say, "Well you do this, and here is how you can write the two questions together." Gave her a suggestion that she can then use herself; because in the end, who has to do the learning? The student. I think I have just got time to show you this. This is an 8th grade classroom, a social studies language arts classroom.

[Video clip]

Teacher (to students): ... two comparing sentences. So now is the time to evaluate yourselves.

One formative assessment that I use in class usually, three to four times a week, would be my guided groups. If you're an A person, that means "Ms. Moore, I have no idea what you just said and I need to hear the lesson again." If you're a B person, it's going to be, "I get it, but I have some clarifying questions," or "I just need to hear you reteach the A people again." Or you're a C person, "I'm an independent thinker, I'm an independent worker; I got it. I can go do this in my seat quietly for independent work time."

Teacher (to students): Annotate in the right-hand margin what you are: are you an A, a B or C? Am I an A, and I'm staying; am I B, I have clarifying questions; am I C, I'm an independent worker and I can get up and go." People to the left and right, turn your heads and make sure that somebody has a letter on their paper. It doesn't matter what it is as long as you can see a letter.

I have their partner check to make sure that they did their job, because we're all working together as a whole. Check, then I say, "Okay C people, you are free to go." They get up; they leave. "A and B people, just move in closer together," and I will ask, "B people, do you have specific questions?" because they're the ones that are right there on the cusp.

Teacher (to students): A and B people, who's an A person? Okay, who's a B person? Okay. B people, do you have questions or you just need me to talk to the A people, and then you get up and leave when you are good?

Student: A people.

Teacher: Do you have a question?

Student: Yeah. Is there like a limit to similes, metaphors and ...?

Teacher: Absolutely not. You have a minimum of one of each, but you can put as many as you think you need in there.

Student: Okay.

Teacher: Good?

Student: Yeah.

Teacher: Cross out you're B; you became a C. Joanna?

Student: I don't know how I would relate it to my constitutional issue.

Teacher: Okay. What's your constitutional issue?

Student: Gay rights.

Teacher: Okay. If gay rights is your main focus, right, what could you say about that?

Student: I don't know. I don't really know.

Teacher: What could you compare it to? Can somebody help her out?

Student: Like comparing them?

Teacher: Yeah. She's just struggling. Her constitutional issue is going to be gay rights.

Student: You can compare it to women's rights or to abortion or ...

Teacher: Oh, see, look Joel's gone. He just became a C person.

Student: I get it now.

Teacher: Does that make sense? So you can compare your gay rights to women's suffrage; you can do it to the Dred Scott case. You can compare your amendment instead. Does that make sense? Okay, cross out your B, you became a C.

[End of video clip]

MARGARET HERITAGE

Okay. So those students are 8th grade. And did you notice what she said in front of her peers? "I don't know." Because it's safe to say that in that classroom. So formative assessment, if you're going to use language and you're going to express your thinking publicly, you have to be doing it in a safe environment, and that classroom is a very safe environment. The saddest thing when I show that around the country—I was in a state in the Midwest recently with a group of middle school teachers and they said, "Well, my kids won't do that. They're not motivated." That's really a sad comment, I think; the way some of our kids are being supported in classrooms. So the idea, then, that students are involved in the learning process through peer assessment, through self-assessment, through teachers giving feedback to students that they can take on their own, so ensuring that the students are an active part of that learning process, not passive recipients. We are not going to get to deep learning, high levels of thinking as called for by the Common Core, if we don't engage our students as learners. And I think formative assessment is one effective way that we can do that.



Now, I was asked to say something about technology. This is my wonderful pathetic slide on technology. But I mean, I'm thinking ... like one teacher I saw in Iowa; she uses these iPods to give feedback to her kids. She just writes ... if they have written something, she will give them verbal feedback and then hand it to them. I have seen teachers take video recordings of group work. If they're not with the group, they want to listen to how the children have been talking. On a pad, you can take photographs, you can write notes, as things are happening in the classrooms. So there is a lot you can do with technology, and I think as the technology gets better and more flexible, there's going to be a lot more we can do with that. But I'm seeing some quite interesting applications already in classrooms.


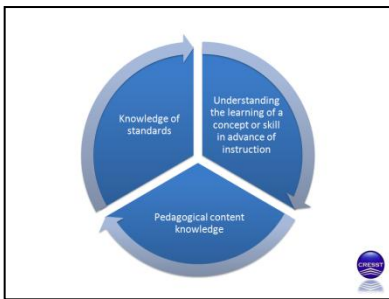
So I've now told you what formative assessment is. The main features of formative assessment; that is, teachers and students working together in classrooms to keep learning on track, to meet those short-term goals that are going to meet the longer-term goals of the standards. In my experience, it demands a lot of teacher expertise, because basically it's about changing the

way you do business in the classroom. If you're one of the "stand and deliver" teachers, and students aren't engaged in actively learning and taking some responsibility for their learning, then you've got a lot to do. And in terms of the teacher expertise required, it's not about giving teachers additional tests. But this is from the Assessment Reform Group, and they talk about formative assessment, or assessment for learning, should be regarded as a key professional skill for teachers. And let me tell you something, it doesn't matter where I go around this country, every single state I go to, they say their teachers are not coming out of higher ed prepared to do this work. So we have a lot to do at the initial pre-service level.

A Key Professional Skill

"...should be regarded as a key professional skill for teachers. Teachers require the professional knowledge and skills to: **plan for assessment; observe learning; analyze and interpret evidence of learning; give feedback to learners and support learners in self-assessment.** Teachers should be supported in developing these skills through **initial and continuing professional development.**"

(Assessment Reform Group, 2002)


So they have to plan for assessment; they have to observe learning through what kids say, make, do, or write; they have to analyze and interpret evidence, which means they have to have a really solid knowledge of the content; and then they have to be able to give feedback to learners and support those learners in self-assessment. And teachers should be supported in developing these skills through initial and continuing professional development. And basically, it's about the way you teach in the classroom. It's not about handing out more tests; it's about the way you teach in the classroom. And so if we look at some of those skills, break them out a little bit, the knowledge of standards—that's going to be deep knowledge of standards is going to be essential. Understanding what it means to learn a concept. What is entailed in learning a concept or a skill in advance of instruction? Because if you're going to be responsive to students and engage in that Rembrandt drawing contingent pedagogical responses, then you have to have some sense of what kids might say, what kids might do, and so on. And I think that's where teachers will need to pool their resources and the pedagogical content knowledge. So it's content knowledge, understanding what the standards entail, and then how to support it pedagogically, and then knowing what is entailed by learning a particular concept.

And what I'm seeing around the country is, and some research is emerging on the importance of teacher learning communities or professional learning communities or whatever you call them, but those seem to be holding a lot of promise, particularly if you can get around 75

minutes a month where teachers come together to talk about learning and formative assessment. We want to encourage teachers on reflective practice, and some states have already developed observation protocols to help teachers be reflective about formative assessment and work with peers through peer observation. We need support from administrators to make the time, to make the commitment, because it's a long...getting to the Common Core through formative assessment, I would say at least, is a five-year program. So a real intense focus, and then this ongoing commitment. But it *can* change. We know from the literature that effective formative assessment works. And effective formative assessment, as I've said, is not just more frequent mini-tests. It has to involve feedback and the students.

Supporting Teachers

- Teacher learning communities
- Reflective practice
- Support from administrators
- Ongoing commitment




And I want to share two quotes to end with from two teachers that I worked with in Syracuse many years ago. And Sharon said, “Formative assessment has not only changed me as a teacher, but I believe it has changed my students as learners.”

Shawn

- *I used to do a lot of explaining, but now I do a lot of questioning.*
- *I used to do a lot of talking, but now I do a lot of listening.*
- *I use to think about teaching the curriculum, but now I think about teaching the student.*

(Heritage, 2010, p. 4)



And then finally, Shawn said—and this is how he was asked to respond to “I used to but now I ...”—this is his underlining. He says, “I used to do a lot of *explaining*, but now I do a lot of *questioning*. I used to do a lot of *talking*, but now I do a lot of *listening*. I used to think about teaching the *curriculum*, but now I think about teaching the *student*.”

And so in conclusion, I would say that Shawn encapsulates very well what we need our teachers to be doing in support of the Common Core Standards and deeper learning. And so I wish all of you well. There's lots of resources out there. Smarter Balanced is putting together a digital library of tools and processes, model lessons with embedded formative assessment, so that should be available to you as well. So please do the work, because I sincerely believe that it will make a difference to our students in California.

Thank you.