

Formative Assessment

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AACC and Schools Moving Up Webinar



Assessment and Accountability Comprehensive Center • National Center for Research on Evaluation, Standards, & Student Testing



Welcome and Housekeeping

- Quick Polling
- Type in a Response
- Type messages (Q &A) into text chat area
- Q & A via Email - eventquestion@wested.org

Poll: Who is on the Webinar?

Are you a:

- school site educator
- school or district administrator
- professional development provider
- State Department of Education administrator
- technical assistance provider
- other

Agenda

- *Polling Question: Who is online?*
- What is Formative Assessment?
- *Polling Question: Definitions of formative assessment*
- The Knowledge Base for Formative Assessment
- Eliciting Evidence
- *Polling Question: Strategies for eliciting evidence*



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Agenda (continued)

- Analyzing and Interpreting Results
- *Polling Question: Giving feedback*
- Involving Students in the Assessment Process
- Formative Assessment Resources on the AACC Data Use Website



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What is Formative Assessment?



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Polling Question

- *What is your definition of formative assessment?*



Our Working Definition

- Assessment that takes place during the course of instruction to shape and refine ongoing teaching and learning.

(Assessment Reform Group, 2002; Bell & Cowie, 2001; Black & William, 1998; OECD, 2005; Sadler, 1989; Shepard, 2000; Shepard, Hammerness, Darling-Hammond, Rust, 2005)



Close the Gap (Sadler, 1989)



Final Report of the National Mathematics Advisory Panel (2008)

“Use of formative assessment in mathematics can lead to increased precision in how instructional time is used in class and can assist teachers in identifying specific instructional needs. Formative assessment should be an integral component of instructional practice in mathematics.” (p. 48)



Sadler (1989)

“Formative assessment can short-circuit the randomness and inefficiency of trial and error learning” (p.120).



Keeping Learning on Track

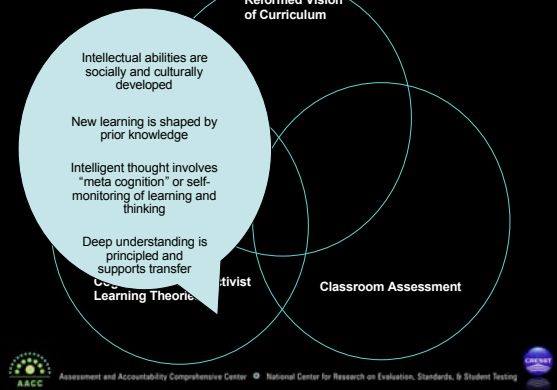


Key Features of the Process of Formative Assessment

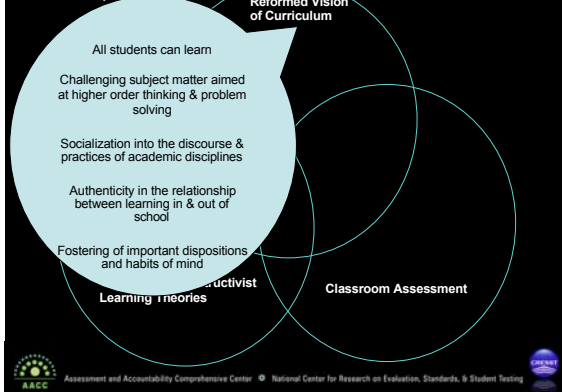
- Establishing clear learning goal(s) and criteria for success
- Eliciting evidence about student learning
- Providing feedback to teachers and students about learning
- Using feedback to adjust instruction and learning in real time
- Involving students in the assessment process



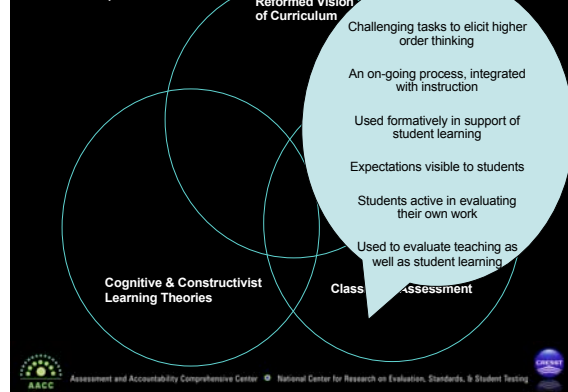
From Shepard, 2000



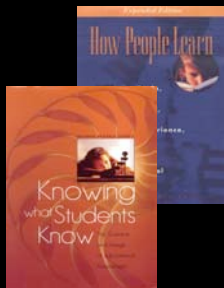
From Shepard, 2000



From Shepard, 2000



Formative Assessment Knowledge Base



How People Learn (NRC, 2000)

Knowing what Students Know (NRC, 2001)



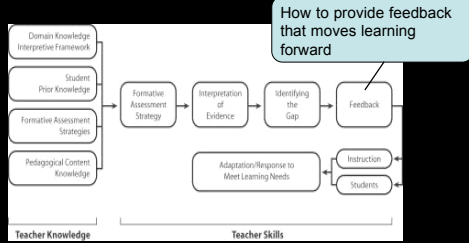
Research on Formative Assessment

Empirical evidence indicates that formative assessment leads to increased learning.

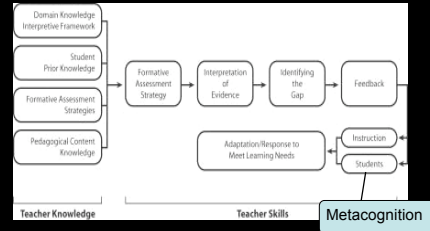
(Bell & Cowie, 2001; Black et al., 2003; Black & William, 1998; 2004; Shepard, 2000)



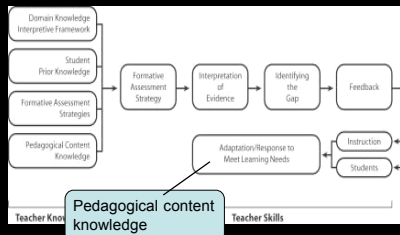
An Interplay of Knowledge and Skills (from Bailey and Heritage, 2008)



An Interplay of Knowledge and Skills (from Bailey and Heritage, 2008)



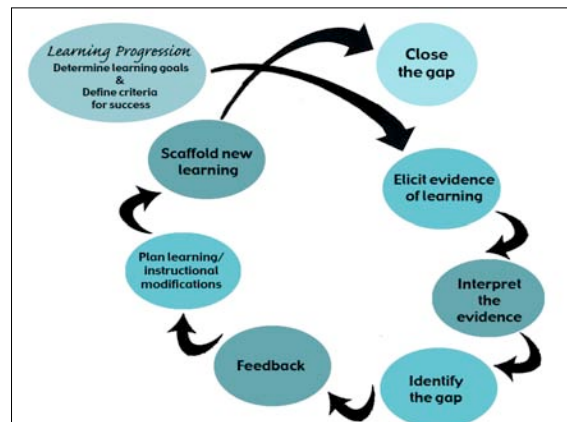
An Interplay of Knowledge and Skills (from Bailey and Heritage, 2008)



Implications

- Policies that support formative assessment
- Pre-service and in-service support for formative assessment
- Communities of practice
- Research that helps build our understanding of formative assessment

Eliciting Evidence of Student Understandings



FA Planning Questions

- What is the learning goal?
- Where are students in the learning cycle?
- What type of evidence is needed to understand how students' learning is progressing?
- What are the criteria for success?
- How will feedback be provided to students?



One Size Does Not Fit All



Polling Question

List 1 or 2 effective strategies for eliciting evidence of student understandings or skills



Strategies for Eliciting Student Understandings

Strategic Questions (QCA, 2001)

- How can we be sure that...?
- What is the same and what is different about...?
- Why do __, __, __ all give the same answer?
- How do you...?
- How would you explain...?

Problems

- Predict-observe-explain, demos, scenarios

"On-the-fly", assessable moments (Shavelson, William)

- Observations, whole class discussions, small group interactions, individual seat work



Strategic Questions to Elicit Student Understandings

- Lauren made a cake to share with her brother and two sisters. She gave $\frac{1}{2}$ to her brother and $\frac{1}{3}$ to each of her two sisters. Explain what is incorrect in her thinking.
- Paige said that $\frac{1}{3}$ is closer to 0 than it is to $\frac{1}{2}$. Do you agree or disagree with her? Discuss in your group and report back.
- When Lindsey solved $\frac{1}{4} + \frac{2}{8}$, she got an answer of $\frac{3}{12}$. Is her answer reasonable or unreasonable and why?

The National Centre for Excellence in the Teaching of Mathematics, 2008



Strategic Questions to Elicit Student Understandings

- Five students present their solutions to the problem:
At Wu's Dairy as single ice cream cone costs 59 cents. A double costs 85 cents. How much more does a double cost than a single? Explain.
- Teacher questions:
*How is Mina's solution like the one Brian showed? How is it like Liona's?
Are there differences?*

NRC, 2001



Problems to Elicit Student Understandings: POE, curriculum embedded

Why things sink and float

Name _____ Teacher _____ Period _____ Date _____

Explain below why things sink and float. Write as much information as you need to explain your answer. Use evidence and examples to support your explanation.

FAST, 2003



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Problems to Elicit Student Understandings



The Periodic Table has had an important impact on the field of chemistry. Please explain:

1. how the Periodic Table is organized
2. how it is useful for predicting chemical reactions.

Please include examples and a complete explanation of your understandings.

ACT, 2008



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Problems to Elicit Student Understandings

In which of these diagrams, is one quarter of the area shaded? Is it A, B, C, or D? Explain your answer.



Willam, 2006



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“On the Fly” Assessment: small group



S1: This block is definitely going to sink. It's bigger than the rest.

S2: No way, it's going to float because it's above the line on the graph on mass and volume.

Teacher: please explain more about what you mean when you say “above the line” on the mass/volume graph. Why does that information matter?



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Analyzing and Interpreting Student Responses

Analyze and Interpret Student Responses

What do these responses tell you about students' understanding of subtraction?

834	999	254	783	402
$\underline{-92}$	$\underline{-486}$	$\underline{-19}$	$\underline{-86}$	$\underline{-100}$
842	513	165	703	302

NRC, 2001



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Analyze and Interpret Student Responses

What do these responses tell you about students' understanding of subtraction?

$$\begin{array}{r} 834 \\ -92 \\ \hline 842 \end{array}$$

$$\begin{array}{r} 999 \\ -486 \\ \hline 513 \end{array}$$

$$\begin{array}{r} 254 \\ -19 \\ \hline 165 \end{array}$$

$$\begin{array}{r} 783 \\ -86 \\ \hline 703 \end{array}$$

$$\begin{array}{r} 402 \\ -100 \\ \hline 302 \end{array}$$

$$\begin{array}{r} 307 \\ -182 \\ \hline 285 \end{array}$$

$$\begin{array}{r} 856 \\ -699 \\ \hline 157 \end{array}$$

$$\begin{array}{r} 606 \\ -568 \\ \hline 168 \end{array}$$

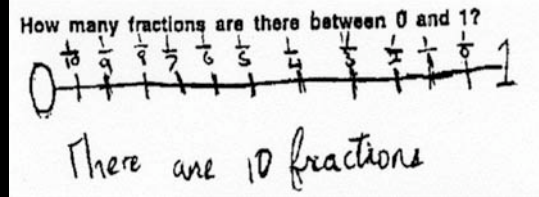
$$\begin{array}{r} 308 \\ -287 \\ \hline 181 \end{array}$$

$$\begin{array}{r} 835 \\ -217 \\ \hline 618 \end{array}$$

NRC, 2001

Analyze and Interpret Student Responses

What do these responses tell you about students' understanding of fractions?



Heritage & Niemi, 2006

Analyze and Interpret Student Responses

What do these responses tell you about students' understanding of fractions?

How many fractions are there between 0 and 1?
 Infinity, because 1 whole can be broken into as many pieces as you like. You can use any number. But as you keep dividing it, it will go on forever. There is no other way to say it except infinity. There is no last number.

Heritage & Niemi, 2006

Guidelines for Providing Effective Feedback



- No use if no learning (Hattie & Timperley, 2007)
- More effective if about interpretations, not lack of information (Hattie & Timperley, 2007)
- Only formative if used by students (Brookhart, 2008)

Guidelines for Providing Effective Feedback

- Clear and descriptive
- Focus on learning goal and criteria for success
- Focus on the task (task-related) vs. the person (ego-related)
- Indicate areas for improvement and strategies vs. providing "fixes"

Example 1: Descriptive Feedback

"The opening paragraph does not capture the audience's attention because it does not clearly state what the speech is about. However, the opening sentence of the second paragraph states your position with an effective contrast. What can you do to improve or strengthen your opening paragraph?"

Example 2: Descriptive Feedback

"You have planned your fair test in general terms. Now think about how you would conduct your test in a systematic way so that you can draw conclusions from your test. Go back to some of the examples of fair tests we looked at from last year's students and consider how you will conduct your measurements and record your data in systematic ways so that you can compare your results."



4th Grade Example: Writing effective paragraphs

- Do cats or dogs make better pets?
 - Be sure to include a clear topic sentence
 - Use at least 3 supporting details
 - End the paragraph with a concluding sentence



Feedback to Anna

This is why I like dogs better than cats. I think dogs are really playful. They can also be strong to pull you or something. They can come in different sizes like a Great Dane or a ^{Bachshund} Weiner dog. They can also be in different colors. Some are just mutts, others are pedigree. Best of all, dogs are cute and cuddly. That is why I like dogs a lot better than cats.

Brookhart, 2008



Polling Question

- Does the feedback provided to the Anna meet the criteria for effective descriptive feedback?
 - Yes
 - No



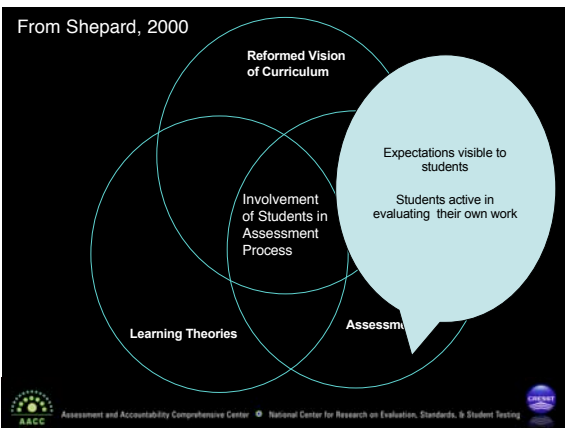
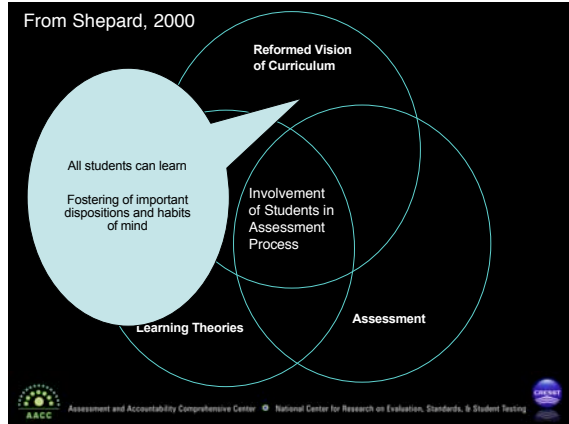
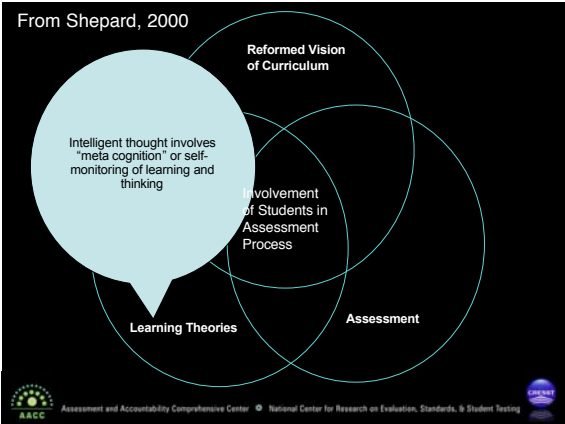
Polling Question

- What feedback would you provide to Anna about her paragraph?



Involving Students in the Assessment Process





Student Involvement




- Shared understanding of learning goals and criteria for success
- Use of feedback
- Self- and peer-assessment (metacognition)
- Developing learning strategies

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A Sailing Ship on an Unknown Sea to an Unknown Destination

A child only knows he is going to school.. Very quickly, the daily life onboard ship becomes all important.. The daily chores, the demands the inspections, become the reality, not the voyage, nor the destination.

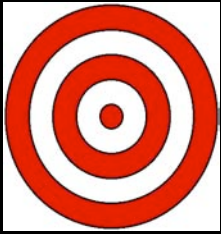


Mary Alice White, 1971

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Learning Goal and Success Criteria

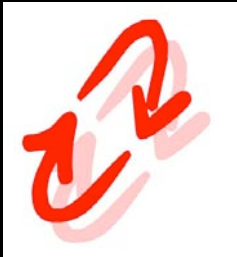
- Learning goal shared with students
- Criteria for success shared with students
- Goal and criteria are manageable
- Goal and criteria are in language students can understand
- Criteria made explicit through exemplars



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Big Idea: There is a system containing different components that interact to influence/create climate over time.		
Learning Goal	Success Criteria	FA Strategies
Understand how to analyze paleoclimatological evidence to reveal historical patterns of warming and cooling on the Earth.	Explain the best ways to analyze large data sets for trends Manipulate data and graph the results of the analysis Identify patterns of warming and cooling trends Draw conclusions from patterns. Justify conclusions by using relevant data.	


Feedback to Students



- Feedback is only formative if it is **USED** by students
- Teachers must allow **TIME** for students to use feedback
- Using feedback helps students develop **LEARNING STRATEGIES**

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Peer-assessment



- Involves thinking about learning
- Needs to be taught
- Deepens understanding of own learning goals
- Can support self-assessment
- Fosters collaboration

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Self-assessment



- Involves metacognition: process of reflecting upon one's own learning
 - *crucial to effective thinking and problem-solving*
 - *hallmark of expert thinking (NRC, 2000; 2001)*
- Supports self-regulation and feelings of control over one's learning

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Self-assessment



- Keeps a focus on learning
- Use information formatively
- Develop learning strategies
- Need to be taught the skills

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Creating the Conditions



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Polling Question

Do you have any other questions/comments on the information covered?

Formative Assessment Resources on the AACC Data Use Website

<http://datause.cse.ucla.edu>

Data Use for Continuous Quality Improvement

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Formative Assessment

Working Definition of Formative Assessment

The following working definition of formative assessment, derived from a review of the assessment literature, provides the framework for the assessment cycle:

Formative assessment is an ongoing process that provides feedback during the course of instruction to teachers and students to close the gap between current learning and a desired goal.

In this section you will find:

- Definitions of formative assessment
- A description of the process of formative assessment
- Research-based strategies of formative assessment
- References on formative assessment included in our library

To proceed:

- Skip to the assessment cycle or the assessment strategies by clicking the thumbnail links to the right.
- Click on the next button to move to the assessment cycle
- Follow this link to access the resources available in the Further Reading section (click the icon to the left of the station to access the article)

next

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Formative Assessment

Clarifying learning intentions and sharing criteria for success

Formative assessment is a process that provides feedback to close the gap between a learner's current performance and desired goals. Learning intentions or goals and criteria for success (i.e., what the desired goal looks like) are foundational to the process.

The first job a teacher has in instruction and formative assessment is to articulate the learning goal for a lesson or series of lessons and identify the criteria for success. Teachers plan instruction to achieve the goal, assess how student learning is progressing toward the goal, and provide feedback to the students related to the success criteria that supports learning and helps them enhance the quality learning intention.

previous next

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Formative Assessment

What research says about clarifying learning intentions and sharing success criteria

*Students are more likely to increase their effort to learn when the intended learning goal "is clear, when high commitment is required for it, and when belief in eventual success is high" (Kluger & DePaul, 1999, 280).

*Specific learning goals focus students' attention and feedback can be directed to them. The goals and associated feedback include information about the criteria for success in attaining them (Battie & Tempelaar, 2007).

*When someone is trying to learn, feedback about the effort has three elements: recognition of the desired goal, evidence about present position, and some understanding of a way to close the gap between the two. (Black

previous move on to strategy 2

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Formative Assessment

Further Reading

- American Educational Research Association, American Psychological Association, & National Council on Measurement in Education. (1999). *Standards for educational and psychological testing*. Washington, D.C.: American Educational Research Association.
- Black, B., & Cowie, B. (2000). *The characteristics of formative assessment in science education*. New York, NY: John Wiley. Retrieved on April 20, 2008 from: <http://www.du.edu/~duerson/Courses/edu555/teaching/teach041405-53a.pdf>
- Black, P., & Villan, D. (1998). *Assessment and classroom learning*. *Assessment in Education: Principles, Policy and Practice*, 5(1), 7-73.
- Black, P., Harrison, C., Lee, C., Marshall, B., & Villan, D. (2003). *Working inside the black box: assessment for learning in the classroom*. *JMI Delta*, 10(1), 9-21.
- Brodhart, S.M. (2003). *Developing measurement theory for classroom assessment purposes and uses*. *Educational measurement: Issues and practice*, 22(4), 5-1.
- Crosby, T.J. (1989). *The impact of classroom-instructional practices on students*. *Review of Educational Research*, 59(4), 438-483.
- Evans, R. (2005). *Using assessment to inform instructional decisions: How hard can it be?* *Mathematics Education Research Journal*, 17(3), 49-61.
- Garbner, J. (Ed.) (2008). *Assessment and Learning*. London: Sage Publications, Ltd.

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Follow Up Questions

For classroom teachers:

In what ways do you use formative assessment to inform your instruction? To what extent are students involved in the assessment process? Are there ways you can improve your FA practices based on today's presentation?

For principals and school administrators:

How do you build in-house expertise for the use of effective formative assessment strategies to support student learning?

For state department of education and policy makers:

What policies do you have in place that support teachers' use of formative assessment? How can those policies be strengthened?

For researchers:

What research questions can be formulated to increase our knowledge and use of formative assessment to improve student learning?



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Next Steps: Archive & Feedback

Archive & Related Resources:

<http://www.schoolsmovingup.net/webinars/formassess>

Feedback

https://www.surveymk.com/s.aspx?sm=0_2bXvTPkV_2fWvnkBovmTFzHQ_3d_3d



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