

Formative Assessment: What Do Teachers Need to Know and Do?

To many of today's teachers, assessment is synonymous with high-stakes standardized tests. But there is an entirely different kind of assessment that can actually transform both teaching and learning. Ms. Heritage describes what the skillful use of formative assessment would look like.

By Margaret Heritage

FORMATIVE assessment, if used effectively, can provide teachers and their students with the information they need to move learning forward. But after more than a hundred years of exhortations and a significant body of research on the topic, the idea that assessment and teaching are reciprocal activities is still not firmly situated in the practice of educators. Instead, assessment is often viewed as something in competition with teaching, rather than as an integral part of teaching and learning.

In our current accountability environment, assessment is not regarded as a source of information that can be used during instruction. Instead, it has become a tool solely for summarizing what students have learned and for ranking students and schools. In the process, the reciprocal relationship between teaching and assessment has been lost from sight. In a context in which assessment is overwhelmingly identified with the competitive evaluation of schools, teachers, and students, it is scarcely surprising that classroom teachers identify assessment as something external to their everyday practice.

Educators recognize that annual state tests provide too little information that arrives too late for planning instruction, and this has prompted districts and schools to supplement state assessments with interim or benchmark assessments. These typically consist of item banks, administration tools, and customized reports, and they usually are administered uniformly to all students three to four times a year. Their greater frequency notwithstanding, these assessments still do not provide teachers with information they can use for ongoing instruction. Despite the enthusiasm for these assessments at the district level and the considerable resources that are being expended on them, the fact remains that they cover too long a period of instruction and provide too little detail for effective use in ongoing instructional planning. At best, they function more as snapshots of student progress and as predictors of student performance on the end-of-year, statewide tests. Indeed, Dylan Wiliam and Marnie Thompson suggest that they might better be described as "early warning summative" tools rather than as tools that can be formative to instruction.¹ Furthermore, teachers do not control how or when these tests occur, what the purpose of the assessment is, or who is assessed. Yet these are the assessments that "count," even though they offer little help to teachers in their daily practice.

Compounding these difficulties is the fact that assessment has traditionally not been a focus of preservice and inservice courses. As Richard Stiggins laments, U.S. educators are "a national faculty unschooled in the principles of sound assessment."² Teachers learn how to teach without learning much about how to assess. Moreover, their administrators also lack training in assessment and therefore do not have the skills to support the development of assessment competencies.

What is missing in assessment practice in this country is the recognition that, to be valuable for instructional planning, assessment needs to be a moving picture -- a video stream rather than a periodic snapshot. If assessment is used to inform effective instruction, then that assessment is quickly rendered out of date. Student learning will have progressed and will need to be assessed again so that instruction can be planned to extend the students' new growth.

Formative assessment practices, if implemented effectively, can provide teachers and their students with the data that they need. Moreover, there is empirical evidence that formative assessment, unlike benchmark assessments, is effective in improving student achievement.³ However, in a profession that already feels burdened by the amount of assessment, there is a danger that teachers will see formative assessment as yet another external demand that takes time away from teaching.

What Is Formative Assessment?

Formative assessment is a systematic process to continuously gather evidence about learning. The data are used to identify a student's current level of learning and to adapt lessons to help the student reach the desired learning goal. In formative assessment, students are active participants with their teachers, sharing learning goals and understanding how their learning is progressing, what next steps they need to take, and how to take them.

Formative assessment involves a variety of strategies for evidence gathering, which can be categorized into three broad types: on-the-fly assessment, planned-for interaction, and curriculum-embedded assessment.⁴

On-the-fly assessment. On-the-fly assessment occurs spontaneously during the course of a lesson. For example, a teacher listening to group discussions hears students expressing misconceptions about the science concept she has been teaching. She then changes the direction of her lesson to provide a quick "pop-up" lesson.⁵ The pop-up lesson enables the teacher to clear up the misconceptions before proceeding with her planned instructional sequence.

Planned-for interaction. In planned-for interaction, teachers decide beforehand how they will elicit students' thinking during the course of instruction. For example, teachers plan the questions they will ask during the course of the lesson in order to enable students to explore ideas, and these questions can elicit valuable assessment information.⁶

Curriculum-embedded assessments. There are two kinds of curriculum-embedded assessments, those that teachers and curriculum developers embed in the ongoing curriculum to solicit feedback at key points in a learning sequence and those that are part of ongoing classroom activities. For example, student mathematical representations created during lessons can function as formative assessments, as can students' science notebooks that are also part of students' regular classroom activity.⁷

Elements of Formative Assessment

There are four core elements of formative assessment: 1) identifying the "gap," 2) feedback, 3) student involvement, and 4) learning progressions. Teachers need to have a clear understanding of each of these elements.

Identifying the gap. In a seminal paper in 1989, Royce Sadler established the essential purpose of formative assessment as the means to identify the gap between a student's current status in learning and some desired educational goal. He stressed that this gap will vary from student to student and spelled out the consequence for pedagogy: "If the gap is perceived as too large by a student, the goal may be

unattainable, resulting in a sense of failure and discouragement on the part of the student. Similarly, if the gap is perceived as too 'small,' closing it might not be worth any individual effort. Hence, to borrow from Goldilocks, formative assessment is a process that needs to identify the 'just right gap.'"⁸

Educational psychologists call this "just right gap" the zone of proximal development (ZPD). Originating with Lev Vygotsky's still-influential formulation, the ZPD is defined as the distance between what the child can accomplish during independent problem solving and the level of problem solving that can be accomplished under the guidance of an adult or in collaboration with a more expert peer.⁹ The teacher's task is to identify and build on immature but maturing structures and, through collaboration and guidance, to facilitate cognitive growth. In the process, the child internalizes the resources required for solving a particular problem, and these resources become part of the child's independent developmental achievement. The term "scaffolding" characterizes the support that adults give to learners in the ZPD to move them from what they already know to what they can do next.¹⁰ Effective formative assessments, then, should identify what a student might achieve in his or her ZPD and enable teachers to adapt teaching to close the gap between the student's current state of learning and the desired state.

Feedback. Formative assessment is designed to provide feedback at multiple levels. First, it provides feedback to the teacher about current levels of student understanding. This feedback also informs what the next steps in learning should be.

Feedback also is central to guiding students through their own next steps. Sadler's model strongly emphasizes feedback to students through the use of the feedback loop. This loop involves teachers and their students in an ongoing process. Effective feedback from teachers provides clear, descriptive, criterion-based information that indicates to the students where they are in a learning progression (defined below), how their understanding differs from the desired learning goal, and how they can move forward. The teacher takes steps to close the gap between the students' current learning and the goal by modifying instruction, assessing again to give further information about learning, modifying instruction again, and so on. In formative assessment, learners must be able to use feedback to improve their learning.¹¹ Another important aspect of the relationship between feedback and learning is that feedback has a strong effect on students' motivation and their sense of self-efficacy -- how they feel about their various abilities -- both of which are major influences on learning.

Student involvement. Improving learning through formative assessment also depends on the active involvement of students in their own assessment.¹² In formative assessment, students learn the skills of self- and peer assessment so that, as Sadler suggests, they collaborate with their teachers in developing a shared understanding of their current learning status and what they need to do to move forward in their learning. In doing so, they are using metacognitive processes. They reflect on their learning, monitoring what they know and understand and determining when they need more information. They also develop self-regulation strategies and are able to adapt their learning tactics to meet their own learning needs. Students must also collaborate with their teachers to determine the criteria for success for each step along the learning progression.

Learning progressions. If formative assessment is to provide guidance to teachers and students, it must be linked to a learning progression. The learning progression should clearly articulate the subgoals that constitute progress toward the ultimate goal. Most state standards, by themselves, do not provide a clear progression for understanding where students are relative to desired goals. In fact, many state standards

do not even provide a clear picture of what learning is expected. Developing learning progressions toward standards is a critical element of formative assessment. Learning progressions provide the big picture of what is to be learned, and they help teachers locate students' current learning status on the continuum along which students are expected to progress.

Students also need to have short-term goals, which are derived from the learning progression and described in terms of success criteria. Success criteria are the guide to learning while the student is engaged in the learning tasks. The success criteria provide the framework within which formative assessment takes place and make possible the interpretation of evidence.¹³

The Knowledge Teachers Need

To use formative assessment successfully in the classroom, teachers need specific knowledge and skills. Four basic elements of teacher knowledge are critical: 1) domain knowledge, 2) pedagogical content knowledge, 3) knowledge of students' previous learning, and 4) knowledge of assessment.

Domain knowledge. Teachers must know the concepts, knowledge, and skills to be taught within a domain, the precursors necessary for students to acquire them, and what a successful performance in each looks like. With this knowledge, they are able to define a learning progression of subgoals toward the desired learning that will act as the framework to guide assessment and instruction. A sufficiently detailed progression will also supply the success criteria for recognizing when students have demonstrated a successful performance and when they have not and for providing students with substantive feedback.

Teachers also need to understand student metacognition as it relates to assessment. As noted earlier, students develop the ability to monitor and assess their own learning so that they recognize when they are learning and when they are not. Linked to self-assessment is self-regulation, the will to act in ways that result in learning. And when students recognize they are not learning, they have the strategies to do something about it. Finally, teachers need to know that students' motivational beliefs -- for example, beliefs about their general level of competence or self-efficacy -- may influence their learning.¹⁴

Pedagogical content knowledge. To effectively adapt instruction to student learning, teachers' pedagogical content knowledge must include familiarity with multiple models of teaching for student achievement in a specific domain and knowledge of which model of teaching is appropriate for what purpose. As already noted, the gap between current status and learning goals will differ from student to student, so teachers will need differentiated instructional strategies and a knowledge of how to use them in the classroom. To support student self-assessment, teachers will also need to be familiar with multiple models of teaching metacognitive processes and self-assessment skills.

Students' previous learning. If teachers are to build on students' previous learning, they need to know what that previous learning is. Students' previous learning includes: 1) their level of knowledge in a specific content area, 2) their understanding of concepts in the content area (i.e., the degree to which they can make generalizations through a process of abstraction from a number of discrete examples), 3) the level of their skills specific to the content area (i.e., the capacity or competence to perform a task), 4) the attitudes the students are developing (e.g., the value the students place on the subject, the interest they display, and their levels of initiative and self-reliance), and 5) their level of language proficiency.

Assessment knowledge. Teachers must know about the range of formative assessment strategies so that they can maximize the opportunities for gathering evidence. In addition, even though formative assessment

strategies will not always meet accepted standards of validity and reliability, teachers need to understand that the quality of the assessment is an important concern. The overriding issue is consequential validity. Because the purpose of formative assessment is to promote further learning, its validity hinges on how effectively learning takes place in subsequent instruction. Teachers also need to know how to align formative assessments with instructional goals, and they need to ensure that the evidence from the formative assessment and the inferences they draw from it are of sufficient quality to enable them to understand where the learner is along a learning progression.¹⁵ Finally, teachers need to know that their own assessments of learning are not the only available sources of evidence; students' self- and peer assessments provide important opportunities for establishing their current learning status.

The Skills Teachers Need

In addition to an appropriate knowledge base, the successful implementation of formative assessment requires specific teacher skills. Teachers need to be able to 1) create classroom conditions that allow for successful assessment, 2) teach the students to assess their own learning and the learning of others, 3) interpret the evidence, and 4) match their instruction to the gap.

Creating the conditions. If students are going to be involved in assessment, two things need to happen. First, teachers must create a classroom culture that supports self- and peer assessment. This means that the classroom is a place where all students feel that they are respected and valued and that they have an important contribution to make. Second, teachers must have the skills to build a community of learners, characterized by a recognition and appreciation of individual differences. Classroom norms of listening respectfully to one another, responding positively and constructively, and appreciating the different skill levels among peers will enable all students to feel safe in the learning environment and to learn with and from one another. Above all, teachers will need the skills to model the "safety" norms of the classroom in their own behavior.

Student self-assessment. Teachers must teach students to assess their own learning and the learning of others. This involves helping students to set goals and criteria for success, to reflect on their own and others' understanding, and to evaluate learning according to the criteria. Strategies to involve students in self-assessment can be as simple as asking students to reflect on their performance through such questions as "Do you think that your response demonstrated understanding? If so, why do you think this? If not, why do you think you did not demonstrate understanding?" From this basis, students can learn to be more independent and can recognize when they do not understand, when they need to do something about it, and what they can do to improve.

Teacher skills also include helping students learn to give constructive feedback to their peers that can provide for future growth. From simple beginnings like saying, "It wasn't clear to me when. . ." or "I didn't understand your point about . . .," students can progress to a detailed analysis of their peers' performance against specific criteria. Once again, the teacher must model all of this in the classroom so that students see that they are collaborators with their teacher and peers in developing a shared understanding of their current learning status and what they need to do to move forward.

Interpreting evidence. Teachers' skills in drawing inferences from students' responses are crucial to the effectiveness of formative assessment. No matter what the assessment strategy -- observation, dialogue, asking for a demonstration or a written response -- teachers must examine students' responses from the perspective of what they show about their conceptions, misconceptions, skills, and knowledge. This

involves a careful analysis of the responses in relation to the criteria for success. In essence, teachers need to infer what the "just right gap" is between the current learning and desired goals, identifying students' emerging understanding or skills so that they can build on these by modifying instruction to facilitate growth.

The analysis of student responses takes place in different time frames, depending on the method of assessment. In on-the-fly assessments, teachers have to make inferences on a moment-by-moment basis. A curriculum-embedded analysis of student work might take place after the lesson and will provide more time for close examination. In both instances the importance of domain knowledge to analysis cannot be overstated; the success of the analysis is wholly dependent on it. Without a strong base of domain knowledge there is a danger that teachers' analyses will focus on the surface aspects of learning at the expense of deeper levels of understanding. An inaccurate analysis of the students' learning status will lead to errors in what the next instructional steps will be.

The analysis of student responses also provides the substance for feedback to students. Teachers need the skills to translate their analyses into clear and descriptive feedback, matched to the criteria for success, that can be used by students to further their learning.

Matching instruction to the gap. It is axiomatic to formative assessment that, if the next instructional steps to close the gap are too hard for the student, frustration will almost certainly result, and if they are too easy, boredom and disaffection are potential outcomes. Therefore, teachers need the skills to translate their interpretations of the assessment results into instructional actions that are matched to the learning needs of their students. This involves selecting the learning experiences that will place appropriate demands on the student and ordering these experiences so that each successive element leads the student toward realizing the desired outcome. Having matched the next steps in learning to the gap, teachers' scaffolding skills come into play. Their skills in deciding on the appropriate strategy must be complemented by their skills in executing the strategy. Their job is to ensure that the student receives appropriate support so that new learning is incrementally internalized and ultimately becomes part of the student's independent achievement.

Matching the instruction to the gap cannot be done successfully without differentiating classroom instruction. In any classroom, one student's "just right gap" will not always be the same as another's. Clearly it is not practical for teachers to engage in one-on-one instruction with each student. However, strategic questioning in a whole-class lesson can provide scaffolding for a range of learning levels, while forming subgroups for instruction, assigning individual activities, and employing a combination of didactic and exploratory approaches help accommodate differences.

Conclusion

Even if teachers have all the required knowledge and skills for formative assessment, without the appropriate attitudes toward the role that formative assessment can play in teaching and learning, their knowledge and skills will lie dormant.

Teachers must view formative assessment as a worthwhile process that yields valuable and actionable information about students' learning. If they do not, formative assessment will be seen as "yet another thing" that is being externally imposed on them. Teachers must view formative assessment and the teaching process as inseparable and must recognize that one cannot happen without the other.

Also, if students are going to be successfully involved in monitoring and assessing their own and their peers' learning, then they need to be regarded by their teachers as partners in learning. This is not an attitude that has traditionally been prevalent in the profession.

If formative assessment is to be an integral part of professional practice, there needs to be a major investment made in teachers. This investment must begin with changes in preservice training. No teacher should exit a professional training program without the knowledge to assess student learning. Furthermore, beginning teachers must have opportunities to develop and practice the skills of assessing before they are responsible for a class of students. Teacher educators have a significant role to play in ensuring that teacher education programs equip their students with the knowledge and skills necessary to integrate teaching and assessment in classroom practice.

The investment in teachers must continue with inservice professional development that involves a commitment by leaders at all levels of the education system. Rather than providing teachers with more tests, leaders at the state, district, and school levels should invest in a coordinated effort to establish structures and provide resources that support effective professional development.

This investment is a long-term project that should not be shortchanged. The payoff will be improved teacher practices and improved student learning, and that is surely worth it.

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1. Dylan Wiliam and Marnie Thompson, "Integrating Assessment with Learning: What Will It Take to Make It Work?," in Carol A. Dwyer, ed., *The Future of Assessment: Shaping, Teaching and Learning* (Mahwah, N.J.: Erlbaum, 2006).
 2. Richard J. Stiggins, "Assessment Crisis: The Absence of Assessment FOR Learning," *Phi Delta Kappan*, June 2002, pp. 758-65.
 3. Paul Black and Dylan Wiliam, "Assessment and Classroom Learning," *Assessment in Education: Principles, Policy and Practice*, vol. 5, November 1998, pp. 7-73.
 4. Richard J. Shavelson, "On the Integration of Formative Assessment in Teaching and Learning with Implications for Teacher Education," paper prepared for the Stanford Education Assessment Laboratory and the University of Hawaii Curriculum Research and Development Group, 2006, available at www.stanford.edu/dept/SUSE/SEAL.
 5. H. Margaret Heritage, Norma Silva, and Mary Pierce, "Academic Language: A View from the Classroom," in Alison L. Bailey, ed., *Language Demands of Students Learning English in School: Putting Academic Language to the Test* (New Haven, Conn.: Yale University Press, 2006).
 6. Paul Black et al., *Assessment for Learning: Putting It into Practice* (New York: Open University Press, 2003).
 7. H. Margaret Heritage and David Niemi, "Toward a Framework for Using Student Mathematical Representations as Formative Assessments," *Educational Assessment*, vol. 11, 2006, pp. 265-82; and Pamela Aschbacher and Alicia Alonzo, "Examining the Utility of Elementary Science Notebooks for Formative Assessment Purposes," *Educational Assessment*, vol. 11, 2006, pp. 179-203.
 8. D. Royce Sadler, "Formative Assessment and the Design of Instructional Systems," *Instructional Science*, vol. 18, 1989, p. 130.
 9. Lev Vygotsky, *Mind in Society* (Cambridge, Mass.: Harvard University Press, 1978); and idem, *Thought and Language* (Cambridge, Mass.: MIT Press, 1986).
 10. David Wood, Jerome Bruner, and Gail Ross, "The Role of Tutoring in Problem Solving," *Journal of Child Psychology and Psychiatry*, vol. 17, 1976, pp. 89-100.
 11. Assessment Reform Group, *Assessment for Learning: Beyond the Black Box* (Cambridge: University of Cambridge, School of Education, 1999).

12. Ibid.

13. Shirley Clarke, *Formative Assessment in the Secondary Classroom* (London: Hodder Murray, 2005).

14. Wynne Harlen, "The Role of Assessment in Developing Motivation for Learning," in John Gardner, ed., *Assessment and Learning* (London: SAGE, 2006), pp. 61-80.

15. Gordon Stobart, "The Validity of Formative Assessment," in Gardner, pp. 133-46.

Last modified May 12, 2008

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