

President's Message

Go Ahead, Teach to the Test!

Francis (Skip) Fennell



Since NCTM released *Curriculum Focal Points*, I have learned that columnists can say whatever they want in a headline to lure readers into their article. You have to admit, my headline grabbed you, didn't it? Well, now that I have your attention, I'll get serious. Let's talk about assessment—formative assessment, to be exact.

NCTM's Assessment Principle indicates that assessment should not be done *to* students; rather, assessments are *for* students and should be used to guide and enhance their learning. There are several forms of assessment. *Formative assessment* involves using classroom-based assessments to collect feedback that can be used to improve teaching and learning. *Summative assessment* measures what students have learned at the end of a set of learning experiences. Summative assessments include state and local school district assessments.

Formative assessment is an essential part of teaching and learning. It takes place in the classroom and is among the daily responsibilities of the classroom teacher. According to NCTM's *Principles and Standards for School Mathematics*, assessments—particularly formative assessments—must be a routine part of classroom activity, not an interruption. Students' learning is enhanced when teachers regularly use formative assessments to make judgments about teaching and learning (Black and William, *Phi Delta Kappan*, October 1998). As teachers become comfortable with a myriad of formative assessment techniques, they tend to develop special expertise in knowing when a lesson is going well, when to stop a lesson in its tracks, when to stretch a lesson into the next day, when to review, when to ask deeper questions, and so on. This “on your feet” ability to use assessment to modify a lesson is an important trait of “highly qualified” teachers, as I define such teachers.

Formative assessment “opportunities” include observations that teachers make when watching students engage in the mathematics they are learning. While observing, teachers should ask themselves, “How are students involved in the lesson activity? How successful are they? What on-the-spot interventions would make the lesson more successful for students?”

As *Principles and Standards* notes, communication deepens understanding. Classroom discussions are an integral component of formative assessment. Students need opportunities to discuss their thinking. This may be through explaining and justifying their reasoning as they solve a problem like the following:

Busch Stadium, home of the world-champion St. Louis Cardinals baseball team, seats about 44,000 people. Ben is in charge of all the hot dog vendors. He expects about $\frac{1}{5}$ of the crowd to buy a hot dog. Hot dogs are priced at \$4.75. Do you think Ben's sales would exceed \$10,000 for the game?

To promote discussions of this problem, try using questions such as, “How did you solve the problem? Why did you solve it that way? Could we solve the problem another way?”

The student interview is another formative assessment technique that teachers can use; it is particularly valuable for assessing the progress of individual students. The interview protocol might engage a student in solving a few problems or exercises. The accompanying questions might require the interviewee to describe the steps that he or she used to complete the example problems. The assessment would then determine the student's level of understanding and would examine the student's thinking. The interview is especially useful for the early identification of misconceptions.

Writing is another powerful formative assessment tool. Students can be asked to create and write down their own problems, provide reflective comments on their daily work, or suggest more efficient solutions to problems. Exit questions, or what I refer to as “quizlets,” offer another quick way to assess informally. Exit questions at the conclusion of a lesson consist of a few problems or examples designed to measure students' understanding. An analysis of students' responses to the exit questions or quizlets can then be used in planning the next day's lesson. Of course, formative assessments may also take the form of a classroom quiz, worksheets, homework, and other projects.

When planning formative assessment, consider how you'll link the formative assessment opportunity to what you are teaching. Perhaps that will mean having students use a hundreds chart to represent common multiples of 5 and 6. It could mean using place-value manipulatives to show different representations of a particular whole number. Timing is very important, and planning how to monitor students' responses and how to use those responses to alter teaching are important as well.

In short, assess as you teach: observe, ask questions, look for representations and responses that demonstrate understanding. Along the way, determine if the formative assessment strategy is actually working or not. Frankly, some students don't like to discuss much with anyone. Observation may work best with these students. Other students may be slow in responding, but with time and experience students' representations of problem solutions can improve. The point is, whatever formative assessment tactics you use should provide accurate information about students' progress—they should reveal students' misconceptions, help you pace the lesson, change topics, and offer remediation or enrichment when it's needed.

Formative assessments are essential components of classroom instruction and should be used to make students' thinking visible. So, teach to this test. No, let me get that right—use formative assessments to guide and monitor teaching and learning mathematics—every day.

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