

Fundamentals of Formative Assessment for Classroom Teachers

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Abstract

Formative assessment is a planned process in which assessment results are used to measure students' progress toward mastering learning targets and for teachers to adjust instruction and content. The formative assessment process is composed of the following nine steps: (1) determining the content to be learned and taught, (2) identifying and clearly describing assessment criteria for the content, (3) determining instructional strategies as a reference point to commence instruction, (4) sharing with students their role in formative assessment, (5) administering a pre-assessment/pretest (if applicable), (6) implementing the instructional strategies, (7) collecting formative assessment data, (8) providing students with feedback from the formative assessment pointed toward learning targets, and (9) readjusting instruction for students based on the formative assessment feedback. Supplementing formative assessment through using technology can make it even more effective and has the potential to lighten the teacher's workload. A close and objective analysis of the state-of-the-art benchmark or interim assessments reveals that they can be useful for improving student learning.

Keywords: classroom formative assessment, student feedback, instructional strategies, benchmark assessments, technology use with formative assessment

Purpose and Context

“Powerful, tangible results come from teachers who are assessing and reassessing student learning—minute-by-minute, hour-by-hour, day-by-day” (Duckor & Holmberg, 2017, p. xix).

Formative assessment is a planned process in which assessment evidence of students' progress toward mastering content is used by teachers to adjust instruction and content and by students to modify their learning strategies (Popham, 2014, p. 290). The formative assessment process is composed of the following nine steps: (1) determining the content to be learned and taught, (2) identifying and clearly describing assessment criteria for the content, (3) determining instructional strategies as a reference point to commence instruction, (4) sharing with students their roles in formative assessment, (5) administering a pre-assessment/pretest (if applicable), (6) implementing the instructional strategies, (7) collecting formative assessment data, (8) providing students with feedback from the formative assessment pointed toward learning targets, and (9)

readjusting instruction for students based on the formative assessment feedback. This article addresses each of these nine steps, how the use of technology can make formative assessment more effective and efficient for teachers, and the role that commercially developed benchmarks or interim assessments can play in enhancing student learning.

Steps One through Three of Formative Assessment

Content, assessment criteria, and initial instructional strategies need to be developed in concert with one another as depicted here.

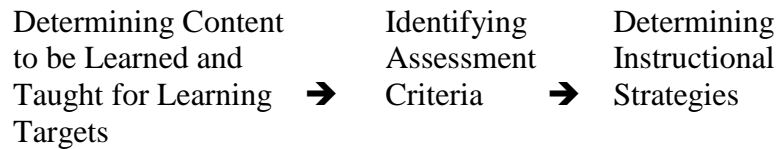


Figure 1. Relationships between content, assessment criteria, and instructional strategies for formative assessment.

Step One: Determining the Content to be Learned and Taught

When teachers develop content for formative assessment, it needs to be broken down into an instructional sequence of progressive subskills that are linked to learning targets (Tomlinson & Moon, 2013). A series of these learning targets compose a learning goal, with several learning goals comprising a learning standard. These subskills, sometimes referred to as building blocks, need to be properly sequenced into the most effective presentation of the content for students to master learning them. Collectively, these activities compose a *learning progression*. In some states (e.g., Maine and Vermont) the learning progression is incorporated into what is labeled *mastery-based learning* (Spencer, 2017).

Step Two: Identify and Clearly Describing Assessment Criteria for the Content

Identification of the specific behaviors representative of mastering the subskills in the learning process is key to meaningful formative assessment. Sometimes it is best to develop a rubric in assessing student performance for a learning target. This requires non-biased data collection by the teacher who is well trained in use of the rubric. There needs to be a tight match between the content activities for a learning target and the rubrics criteria. This is one reason why the identification of content knowledge and assessment are done at the same time, while simultaneously identifying the instructional strategies. Students need to understand what content is expected to be mastered and what performance of this mastery looks like (Hughes, 2010).

Competence in classroom assessment for teachers centers on the skills needed to construct quality formative assessments that provide accurate information for student learning that will move learning forward (Stiggins, 2010). Teachers need to be provided with face-to-face and digital staff development concerning assembling high quality formative assessment criteria that are tightly linked to the content of learning targets, while taking into consideration the instruction strategies utilized.

Step Three: Determining Instructional Strategies as a Reference Point to Commence Instruction

The direct or explicit method of instruction is useful for quickly disseminating content by the teacher *directing* learning. The teacher's activities supply the stimuli for students rather than students discovering or otherwise providing the stimuli. Conversely, the discovery method (also referred to as the non-directive, inquiry, and inductive method) creates an environment in which students need to process input information and through recognizing relationship and causation, put the pieces of the puzzle together to *discover* the content's purpose.

Differentiated instruction fits well with teacher driven classroom formative assessment. Tomlinson and Moon (2013) identify general guiding principles of differentiation as: (a) an environment that encourages and supports learning, (b) quality curriculum, (c) assessment that informs teaching and learning, (d) instruction that responds to student variance, and (e) leading students and managing routines. Collaborative, individualized, and personalized instruction models all have merit as initial instructional strategies to be considered for use with the formative assessment process.

Step Four: Sharing with Students Their Role in Formative Assessment

Taking into consideration students' grade and developmental levels, the ultimate goal for their role in formative assessment is for them to *own* the assessment results. Education should cause students to become autonomous, self-directed learners who truly have a sense of control and confidence in their learning (Tomlinson & Moon, 2013).

Teachers sharing assessment feedback with students in the context of students improving their learning is aimed at empowering students to be able to self-regulate. Students know better than anyone else—taking into consideration their grade and developmental levels—their thoughts, actions, and the context in which formative assessment feedback is most beneficial to them (Andrade, 2010). Self-regulation is the process whereby students set learning goals and monitor them, while managing their motivation and thought processes. This is precipitated by thoughtful reflection and input from peers and the teacher (Pintrich, 2000). According to Andrade (2010, p. 96), students' self-regulation of learning based on formative assessment feedback is a function of: (a) forethought (goal setting—"where am I going?"), (b) performance and control (observation and assessment—"how am I doing?"), and (c) reflection (judgment and reaction—"what's next?"). This self-regulation process represents a student's self-assessment to take action for future learning and is an extremely important quality of successful adults in the world of work (Andrade, 2010, p. 346).

Step Five: Administering a Pre-assessment/Pretest (if Applicable)

Determining what students know about the content—subskills of learning targets—before commencing with instruction allows teachers to focus on what students have learned and not learned, thus being more efficient in the use of students' time and avoiding redundancy (Greenstein, 2010). (With kindergarten and first grade students, readiness may be a more appropriate term than pre-assessment.) The background knowledge students bring into the

classroom influences how they process and comprehend a lesson's content (Fisher & Fry, 2014). Being aware of this background knowledge gives the teacher reference points that students are likely to use to process the content presented. Pre-assessment fosters instructional differentiation that Tomlinson and Moon (2013) define in five components: (1) content, (2) the process a student uses to master content, (3) the product that shows what the student learned, (4) the effect of learning climate and interactions among students and teacher, and (5) learning environment—personal, social, and physical arrangement of the classroom (p. 12).

Soliciting information on prior knowledge from students can be difficult if done in the whole class setting because of students' apprehensions to share openly (Duckor & Holmberg, 2017). This informal approach can also be time consuming and less accurate for targeting specific needs of students than a more formal approach such as a written or digital (usually faster) pretest. Duckor and Holmberg (2017) suggest the use of priming which is creating a supportive and nurturing environment through information that sets the stage for the lesson's content and prompts students to share prior knowledge.

Step Six: Implementing the Instructional Strategies

The initial instructional strategies to be used are identified in step 3—determining initial instructional strategies. As these preplanned instructional strategies are implemented, a teacher needs to be ready to make modifications based on how students react. As all good teachers know, when instructional *plan A* is not working they should have *plan B* ready to implement. Excellent teachers adjust *on the fly* based on student reactions. However, it is important that sufficient time is given to allow the preplanned instructional strategies—plan A—sufficient time to work before abandoning them.

Step Seven: Collecting the Formative Assessment Data

This section presents three of many methods to collect formative assessment data: (1) written work, (2) observing non-verbal student cues, and (3) use of questions. Other typical methods used are quizzes, components of a project, presentations, computer-based games, observation scales, experiments, role plays, simulations, case studies, and portfolio samples.

Written Work

Writing for learning is frequently used to measure student learning because it is concerned with collecting students' thoughts informally with the emphasis on content rather than formality. With writing for learning, formal rules of writing such as sentence structure, or even complete sentences, are not a major concern. The focus is on quickly obtaining the key thoughts, conclusions, reference points, and knowledge indicators for mastering a learning target's subskills. Writing for learning can be done on paper, a computer, a tablet, or other electronic devices. Teachers often use prompts as methods of collecting writing for learning assessment data (Fisher & Fry, 2014).

Observing Non-Verbal Student Cues

As teachers spend more time being acquainted with students, they often learn how to effectively use non-verbal student behaviors as data to supplement other formative assessment in interpreting student understanding. Common non-verbal cues are body language and movement such as gestures, facial expressions (e.g., smile or frown), eye movements, blushing or paleness, and open or closed body posture (McMillan, 2014, p. 98). These non-verbal cues must be put in the context of students' cultural and personal attributes (McMillan, 2014). Teachers also need to be cognizant of their own non-verbal behaviors, since these behaviors may impact the quality of information collected from students.

Use of Questions

Holistically, questions must gather information about students' understanding and progress of the knowledge needed to master a learning target (McMillan, 2014). *Essential* questions are excellent for engaging students in inquiry and information about plausible responses. Closely aligned with essential questions are those that promote student reasoning and comprehension through the verbalization of their ideas (McTighe & Wiggins, 2004). Walsh and Sattes (2015) caution against over using questions of recitation at the expense of using questions that prompt rich discussion among and between students and the teacher.

In most situations, questions that can be answered *yes or no* should be avoided. Sometimes it is necessary to use a *gateway* question. This means that if the correct response is not given by a student, content input is immediately needed which must be mastered before progressing to new content. It is also important for teachers to give proper wait time for students to respond to questions.

Step Eight: Providing Students with Feedback from the Formative Assessment Pointed Toward Learning Targets

Feedback is the information loop of the learning cycle that provides students with the *knowledge of results* regarding how well they are doing at mastering a learning target (Marzano, 2017, p. 6). In simple terms, it is how well a student is progressing on mastering content (Stiggins, 2010). Feedback provides the teacher and student with a *shared awareness* of the student's progress and what the student still needs to accomplish to master the learning target. Feedback also provides the teacher with reference points for adjusting content and instruction to improve student learning.

Hattie (2016) identified three separate levels of feedback: (1) task, (2) process, and (3) self-regulated (pp. 40-41). *Task feedback* provides information on how well a student is progressing toward mastery of a learning target and specifically clarifies what needs to improve if mastery has not occurred. *Process feedback* describes progress for knowing the underlying functions related to a learning target's content. It also provides information for what strategies a student can use to gain insights as well as what actions to take to improve achievement. *Self-regulated feedback* describes how students can monitor, direct, and regulate their actions to complete mastery of the learning target (Hattie, pp. 46-47). Self-regulation also fosters a willingness for a student to seek more feedback and continue to *self-correct*.

Feedback needs to be delivered in a positive context and occur as soon as possible in relation to the behaviors or thoughts that need correction. It must be specifically linked to a subskill or a learning target, be descriptive, and not be judgmental (Brookhart, 2010). Teachers are cautioned to avoid *information overload* by giving too much feedback too rapidly. When initiating formative assessment, teachers must set the stage for the role feedback plays in student learning. During formative assessment, insights and suggestions from students should be solicited while considering their developmental levels, ages, and prior knowledge. It is extremely important for teachers to give positive feedback in order to reinforce successful performance. Teachers should be cautious about providing too much corrective feedback at one time since it can be overwhelming, discouraging, and prompt a student to *give up*. It is important for a teacher to remember that feedback should always move learning forward (Popham, 2014).

Step Nine: Readjusting Instruction for Students Based on the Formative Assessment Feedback

The needs identified for students related to the subskills for learning targets by the formative assessment feedback are critical reference points for readjusting instruction. Dialogue between the teacher and students is useful in order for the teacher to gain insights on what instructional readjustments are likely to be successful when reteaching the content for identified subskills. The teacher needs to reflect on what instructional strategies may work best for reteaching based on experiences from previous years and dialogue with fellow teachers and the administrative staff.

Technology Assisted Teacher Driven Classroom Formative Assessment

“Given the speed with which computer-based technologies can collect, analyze, and report information, computer-based tools have great potential to increase the efficiency and the individualization of formative assessment” (Russell, 2010, p. 135).

Effective implementation of formative assessment by a teacher is an act of beauty to observe. It requires a teacher who has excellent formative assessment competencies, dedication to maximizing learning for each student, and high energy. Using formative assessment is extremely hard work and can be very time consuming. Supplementing formative assessment through the use of technology can make it even more effective and has the potential to lighten the teacher’s workload.

Technologies such as electronic student response systems (e.g., clickers) are useful for simultaneously checking all students’ understanding. These systems allow teachers to quickly check every student’s understanding compared to only being able to sample several students because of time constraints. Commercially developed technology-based formative assessment programs provide cues and tutoring feedback to students. These programs indicate how individual students respond to problems and how much support they need from the program to generate correct responses through continuous assessment feedback. They also furnish detailed diagnostic reports for teachers to adjust instruction accordingly (Feng, 2012).

Digital-based formative assessment has the potential to involve students in becoming authentic owners of the feedback results (Green, 2017). Many of these technology-based programs have visually vibrant displays that are motivational to students and designed to make learning fun (Dyer, 2017). Connecting teachers to resources tightly aligned with students' needs based on formative assessment results are significant attributes to technology's usage. The bottom line is that computer-based technologies have great potential for teachers to quickly collect, analyze, and report classroom-based formative assessment (Russell, 2010).

Stealth assessment is a new technology driven approach to formative assessment that can provide useful student performance data to teachers in a very time efficient manner. This approach combines student assessment information embedded in multiple computer-based sources and links the results to specific learning targets for each student. Stealth assessment can be more authentic and less invasive to students than traditional benchmark assessment. This is because the students are unaware assessment is taking place and are likely to be more relaxed and natural in their responses (Sireci & Faulkner-Bond, 2016).

The teacher must be the decision maker concerning if, when, and how best to use technology in the formative assessment process. As Mahoney (2017) notes, "Think about technology as a tool, but a tool that has to fit a purpose . . . don't lead with devices, lead with purposeful learning" (p. 53). The particular technology used must fit into and be an asset—not a time stealer—to a teacher's overall approach to formative assessment. Because the most effective formative assessment happens on a moment-to-moment basis, it can sometimes be challenging to use technology-assisted formative assessment without distracting from a teacher's *flow* (Feng, 2012).

Cost, staff training, and ease of use are factors to consider before utilizing technology supported formative assessment. Any technology system used must provide feedback to students and the teacher that is easily understood. Ultimately, the relationships and communications of teachers and students are crucial elements in ensuring the likelihood of effective formative assessment. If technology interferes with these elements, it is likely to be more of a distraction than an enabler (Feng, 2012).

Formative Assessment as Benchmark or Interim Assessment

"The research-based concept of formative assessment, closely grounded in classroom instructional processes, has been taken over (hijacked) by commercial test publishers and used instead to refer to formal testing systems called benchmark or interim assessment systems" (Shepard, 2014, p. 294). Assessment experts such as Shepard (2014) and Popham (2014) label benchmark assessments *interim assessments* because these assessments do not meet their criteria of formative assessments—such as providing meaningful feedback to students. McMillan (2014) criticizes benchmark assessments because he believes there are often few meaningful assessment results available to the teacher to use that influence subsequent instruction (p. 117).

This article uses the term benchmark assessments with the understanding that some sources may call them formative assessments, while others refer to them as interim assessments. The position taken here is counter to those who discard benchmark assessments due to lack of feedback data useful for students to improve instruction and student learning. A close and objective analysis of the state-of-the-art benchmark or interim assessments reveals that they can be, and in many districts, are useful in improving student learning in schools. If properly

integrated by the teacher, benchmark assessments can play a crucial role in improving student achievement.

The passage of the *No Child Left Behind (NCLB) Act* in 2002 (reference) prompted commercial test publishers to develop benchmark assessments that are given several times during the school year, often in relation to a state's NCLB summative test administered near the end of the school year. The *Every Student Succeeds Act (ESSA)*, which replaced NCLB, is likely to prompt continuation of accountability testing by states. However, it is possible that many states will *go it alone* rather than being a part of an assessment consortium such as the Partnership for Assessment of Readiness for College and Careers (PARCC) or Smarter Balanced under ESSA. Benchmark assessments are likely to continue and, if properly used, should aid in improving student learning.

A benchmark assessment in the form of a baseline measure is usually given as a needs assessment or pretest at the start of the school year. It provides feedback to the teacher, and sometimes to the student depending on the particular commercially used assessment program, indicating the extent to which each student has demonstrated achievement on skill subsets or learning targets. If a state's assessment test is given in April, for example, several additional benchmark assessments are spaced out after the start of the year benchmark and before the state test. These interim benchmark assessments furnish feedback to the teacher on each student's progress on learning targets, as well as aggregate data for the class. Some commercially developed benchmark assessments also link results to curriculum materials.

Benchmark assessments are often purported to predict how well students will do on the summative state assessment test. Their results have the potential to be useful to teachers in adjusting content presented to each student based on individual needs for learning targets. A major challenge to the teacher is deciding if, when, and how to integrate the benchmark assessment results into the daily classroom formative assessment process.

Concluding Thoughts

Teacher driven classroom formative assessments have tremendous potential to enhance student learning. Key components of effective formative assessment are feedback to teachers for adjusting instructional strategies and feedback to students so they have ownership in utilizing the achievement results. Implementing formative assessment can be very labor intensive and time consuming for teachers. Hence, it is important for teachers to initially pace themselves and selectively use formative assessment. Computer-based technologies linked to formative assessment can save teachers time and often improve the assessment process. Benchmark or interim assessments can also provide meaningful results for the teacher and students to aid in the enhancement of student learning.

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