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Formative and Summative Assessment in the Classroom

In this article, we provide brief overviews of the definitions of formative and summative assessment and a few examples of types of formative and summative assessments that can be used in classroom contexts. We highlight the points that these two types of assessment are complementary and the differences between them are often in the way these assessments are used. We also list several resources that may be useful for teachers who wish to know more about using formative and summative assessments in their classrooms.

In the current age of high-stakes testing, teacher accountability, Common Core Standards (2014), and the recently superseded No Child Left Behind Act (2002), teachers were, and continue to be, under enormous pressure to get their students to achieve. Two tools that teachers commonly use to assess student learning of new material and knowledge of state standards are formative and summative assessment. Formative assessment involves gathering data for improving student learning, whereas summative assessment uses data to assess about how much a student knows or has retained at the completion of a learning sequence (American Educational Research Association, American Psychological Association, & the National Council on Measurement in Education [AERA, APA & NCME], 2014).

Scores on all types of assessment should meet minimum standards of reliability and validity (AERA, APA, & NCME, 2014), with decisions that are high-stakes requiring more robust assessment scores. However, these psychometric properties have generally not been evaluated in formative assessments, especially ones developed by classroom teachers, as these assessments have been considered informal and low-stakes. The response-to-intervention (RtI) movement in schools has promoted ongoing monitoring of all students with "appropriate measures [that] have a documented relationship to *positive child outcomes*" (Gresham, 2007, p. 17). This use of

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formative assessment at the whole-school level, as a precursor to formal assessment, has led to teachers increasing their reliance on assessment in general. This increased use of formative assessment has resulted in test publishers developing and validating formative assessments that are based on national samples and that yield more psychometrically robust scores than those typically developed and used by teachers. Additionally, some summative assessment systems also have interim assessments, which are intended to provide teachers with data that they can use as they are instructing the students in preparation for the summative assessment (e.g., Smarter Balanced Assessment Consortium, n.d.).

In this article, we review the traditional definitions of formative and summative assessment and highlight the characteristics and use of both in classroom settings (see Table 1). Importantly, the distinction between formative and summative assessment is primarily related to the ways in which assessment results are used, as many assessments developed for formative purposes can be used for summative purposes and vice versa. Moreover, the increased focus on testing, as well as student and teacher accountability, has resulted in a blurring of the low-stakes/high-stakes distinction between formative and summative assessment.

Formative Assessment

Wiggins (1998) asserted, "The aim of [formative] assessment is primarily to educate and improve student performance, not merely to audit it" (p. 7). Formative assessment has been defined as "activities undertaken by teachers—and by their students in assessing themselves—that provide information to be used as feedback to modify teaching and learning activities" (Black & Wiliam, 2010, p. 82). Thus, formative assessment encompasses a whole host of tools that provide feedback to teachers or students to help students learn more effectively (see Table 1). In addition to providing an ongoing source of information to teachers about current student understanding so that teachers can

Table 1

Characteristics of Formative and Summative Assessments

Characteristic	*Formative Assessment*	*Summative Assessment*
Purpose	To improve teaching and learning	Evaluation of learning outcomes
	To diagnose student difficulties	Placement, promotion decisions
Formality	Usually informal	Usually formal
Timing of administration	Ongoing, before and during instruction	Cumulative, after instruction
Developers	Classroom teachers to test publishers	Classroom teachers to test publishers
Level of stakes	Low-stakes	High-stakes
Psychometric rigor	Low to high	Moderate to High
Types of questions asked	What is working	Does student understand the material
	What needs to be improved	Is the student prepared for next level of activity
	How can it be improved	
Examples	Observations	Projects
	Homework	Performance assessments
	Question and answer sessions	Porfolios
	Self-evaluations	Papers
	Reflections on performance	In-class examinations
	Curriculum-based measures	State and national tests

adjust instruction to maximize student learning (Faculty Development and Instructional Design Center, n.d.), formative assessments are also used to develop interventions to improve student learning (Shepard, 2006; Stiggins, 1994).

Formative assessments also inform students and those supporting the teacher and the students (e.g., tutors, parents) about what the learning goal is, where the students are in relation to that learning goal, and what can be done to improve subsequent performance (Black & Wiliam, 2010; Sadler, 1989). Although formative assessments can be graded (e.g., quizzes), evaluations of these assessments usually are not factored into final grades (i.e., summative assessments) because the focus is on assessing student understanding and teaching effectiveness (Faculty Development and Instructional Design Center, n.d.).

Formative assessments occur in two primary forms: spontaneous and planned (Cook, 2009). Spontaneous formative assessments are impromptu, such as (a) when a teacher reads misunderstanding in the body language of students during a class session and queries the student about her understanding, (b) when a teacher calls on a student to provide an example of a concept just covered, or (c) when question-and-answer sessions are conducted during a lesson. These activities provide information about student learning in real time. Planned formative assessments include activities such as quizzes and homework exercises that are assigned to assess student progress. Regardless of the actual type of formative assessment being administered (see Table 1), these strategies are all intended to improve student learning (Dwyer & Wiliam, n.d.) and help to answer the underlying questions of formative assessments: "What is working," "What needs to be improved," and "How can it be improved," (Wiliam & Thompson, 2007, p. 64)?

Formative Assessment in the Classroom

We now briefly describe several formative assessments that teachers can employ in their classrooms. The first of these is *phonemic awareness*, which means an understanding that the letters of the alphabet used in written words represent phonemes or sounds in spoken words. Without a grasp of phonemic awareness—typically referred to as phonics—students will not learn to read. First-grade teachers can assess several aspects of phonemic awareness using a single sheet of paper with the letters of the alphabet *in random order* and occurring more than once, and asking students to (a) name each letter (letter identification) and (b) to say the sound that each letter makes (sound/symbol correspondence). Students who are more advanced can be asked to indicate which words in a set of words that the teacher reads aloud starts with the same sound (e.g., bird, gum, corn, bus), and which word in a set begins with a different sound (e.g., head, hand, tree, hut). Even more advanced students can be asked to if they know what word the sounds, /m/ /o/ /p/ make (blending) or to indicate what sounds are in the word *bat* (the correct answer is /b/ /a/ /t/). Importantly, these types of assessments can be done using one-minute probes, and the students' errors provide the assessment data on which additional instruction is based. For example, does the student know the letter names and sounds? Can students identify which of the spoken words start with the same sound?

The *exit ticket* is another formative assessment methodology (Cornelius, 2013). It consists of the teacher posing a question, which can vary in difficulty, to students at the end of the day based on the day's lesson. Students have to write down a response to the question and hand it in to the teacher as they leave the classroom; the written response is their exit ticket (Wylie, Lyon, & Goe, 2009). The teacher then reviews the responses for student understanding and creates small discussion groups the next day based on students' answers, putting students with a stronger grasp of the evaluated concepts in groups with students who have a less firm grasp of the concepts. After students are in groups, the teacher reviews the concept that students were evaluated on the day before, highlighting the areas where students were unclear before letting the students discuss the topic. The teacher also identifies a student with a strong grasp of the concept as the *topic leader* for each group based on student responses, and

monitors the discussions of the students to ensure that students understand the concept being taught.

The exit ticket provides the teacher with knowledge of students' current levels of understanding on a given topic—in essence, how effective the lesson on the topic was—and positions students to self-reflect on their own level of understanding on the given topic (Wylie et al., 2009). Moreover, the teacher's brief review and the small group discussion provide students who need remediation with an additional opportunity to learn the assessed concept; students who already understand the concepts also get the chance to develop a deeper understanding of the assessed concepts by explaining them to their peers.

Summative Assessment

Summative assessments are "cumulative assessments … that intend to capture what a student has learned, or the quality of the learning, and judge performance against some standards" (National Research Council, p. 25). Unlike formative assessments, which are generally used for providing feedback to students and teachers, summative assessments are generally high-stakes assessments and used to get a final assessment of how much learning has taken place—that is, how much does a student know (Gardner, 2010). Summative assessments are almost always graded, are typically less frequent, and occur at the end of segments of instruction. Examples of summative assessments are final exams, state tests, college entrance exams (e.g., GRE, SAT, & LSAT), final performances, and term papers. Typically, if a student performs satisfactorily, no more formal learning on the assessed subject occurs after a summative assessment, except in the case of a cumulative final examination.

In addition to their role in determining a student's level of success or proficiency at a particular time, summative assessments are also used to determine eligibility for special programs (e.g., gifted and talented education), to assess if a student should advance to the next grade level, to provide career guidance, or to assess qualifications for awards (Harlen & Gardner, 2010). In the classroom, summative assessments should not only give students the chance to demonstrate their conceptual understanding, but also give students the opportunity to think critically as they apply their understanding under novel conditions to solve new problems or to explain novel phenomena (National Research Council, 2001).

Summative Assessment in the Classroom

The following paragraphs contain descriptions of several common summative assessments in school settings (see Table 1). Perhaps one of the most common summative assessments used in schools are the mandated tests by the state. These tests go through periodic revisions, with one of the most recent iterations being the Smarter Balanced Assessments (n.d.), which are based on the Common Core Standards (2014) that have been adopted by more than half of the states in the United States. These tests are designed to be administered during the last 3 months of the school year in Grades 3–8 and 11, with the following summative goals:

- [To] accurately describe both student achievement and growth of student learning as part of program evaluation and school, district, and state accountability systems;
- [To] provide valid, reliable, and fair measures of students' progress toward, and attainment of the knowledge and skills required to be college- and career-ready; and
- [To] capitalize on the strengths of computer adaptive testing—efficient and precise measurement across the full range of achievement. (Smarter Balanced Assessments, n.d.)

These summative assessments will include not only multiple-choice questions, but also extended response items, and technology-enhanced items, as well as performance tasks (described subsequently), so that students can demonstrate problem-solving and critical thinking in addition to retained knowledge, with the ultimate goal of

preparing students "to succeed in entry-level careers, introductory academic college courses, and workforce training programs" (Common Core Standards, 2014).

Another common type of summative assessment is *performance-based assessment*. Performance-based assessments include any activity that provides an opportunity for students to *demonstrate* their learning or knowledge (National Research Council, 2001), such as

(a) Product-assessments that result in tangible indicators of knowledge that resemble final products that would be produced in the real world, such as a 3D model in a drafting class, a short story in an English Literature class, or a timeline in a history class;
(b) Performance-assessments that involve teachers directly observing the application of taught skills or information, such as a teacher observing a final speech in a public speaking class; and
(c) Process-focused assessments, through which teachers can evaluate the *process* of learning as well as the outcome, such as when a teacher has students *show their work* or *think out loud* as they answer questions. (see McTighe & Ferrara, 1998)

Performance-based assessments are considered one of the best forms of assessment because they require students to demonstrate their knowledge instead of simply *parroting back* memorized facts (McTighe & Ferrara, 1998). Additionally, performance assessments test content-specific knowledge, the integration of information across subjects, and decision-making skills (McTighe & Ferrara, 1998). However, performance-based assessments are time intensive for both teachers and students, and are often difficult to implement well.

Conclusion

Although we highlight many of the differences between formative and summative assessments in this article, ideally, the two types of assessment should complement each other, as they serve related purposes (National Research Council, 2001). Formative assessment should be used during instruction to help students learn material initially and throughout the learning process. Summative assessments can be used at the end of a unit, chapter, quarter, or semester to assess and evaluate how much learning students have gained and retained. Additionally, on occasion, it may make sense to use a formative assessment summatively or a summative assessment formatively, depending on the use of the outcome of the assessment (National Research Council, 2001). For example, a teacher can give his class a test (usually a summative assessment) to evaluate the topics that still need to be covered or retaught, rather than to calculate a final grade. In sum, any assessment of understanding for feedback is formative (assessment for learning) and any assessment used to get an evaluation of the student's knowledge at a point in time is summative (assessment of learning; Gardner, 2010). Finally, it is important for teachers to be mindful of the goals of their assessment and how they plan to use assessment results, so that they choose the best tools to accomplish the goal at hand.

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Additional Resources

1. American Psychological Association, Coalition for Psychology in Schools and Education. (2015). *Top 20 principles from psychology for preK–12 teaching and learning*. Washington, DC: Author. Retrieved from http://www.apa.org/ed/schools/cpse/top-twenty-principles.aspx

   This document, developed the Coalition for Psychology in the Schools and Education of the American Psychological Association, describes 20 principles across five domains (e.g. how students think and learn, what motivates students), and includes three principles related to assessing student progress.

2. Cornelius, K. E. (2013). Formative assessment made easy: Templates for collecting daily data in inclusive classrooms. *Teaching Exceptional Children*, *45*(5), 14–21.

   This article provides the reader with several templates to quickly collect formative data about students make the task of formative data collect easy. It includes customizable charts that can be used with both general and special education students.

3. Dyer, K. (2013, July). *22 easy formative assessment techniques for measuring student*

learning. Retrieved from https://www.nwea.org/blog/2013/22-easy-formative-assessment-techniques-for-measuring-student-learning/

This blog provides 22 formative assessment techniques—12 from this author and 10 from another linked blog. These assessments can be done in a very short time, are easy to administer and provide immediate feedback that teachers can use to identify which students need more assistance.

4. Worrell, F., Brabeck, M., Dwyer, C., Geisinger, K., Marx, R., Noell, G., & Pianta R. (2014). *Assessing and evaluating teacher preparation programs*. Washington, DC: American Psychological Association.

Although much of the discussion of formative and summative assessment has focused on students in K–12 settings, this document describes formative and summative assessment strategies in three domains—observations, surveys, and student learning outcomes—for use with student teachers in teacher education programs.