

## **Improving Students' Learning (Academic Achievement) through Teachers' Effective Use of Formative Assessment**

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### **Abstract**

*The purpose of this article is to explain how teacher-driven formative assessment can enhance students' learning and improve academic achievement. The basic principles of formative assessment are: (a) developing learning progressions composed of learning targets for the content to be mastered by students, (b) collecting student performance data for the learning targets, (c) providing students with feedback on their performance in relation to a learning target, and (d) adjusting instructional strategies to the needs of each student so that content is mastered. The conclusion drawn is that formative assessment is more effective at enhancing student learning and improving student achievement than summative assessment. Summative assessment is administered at the end of a time period and often used for comparative purposes (e.g., Program for International Student Assessment [PISA] results country to country) and grading students.*

**Keywords:** formative assessment, student learning, student achievement, teaching strategies

### **1.0 Context**

Countries throughout the world are continuously evaluating how to enhance learning for students to maximize academic achievement. Examples of immediate benefits to students for high levels of academic achievement are satisfaction, motivation, recognition, and avenues to a more academically challenging curriculum. Current students will benefit later in their adult lives both economically and from general self-satisfaction in life. Maximizing students' achievement has a huge economic benefit to a country.

Reported assessment data that indicate students' achievement through sources such as the Program for International Student Assessment (PISA) are summative, meaning that such data are obtained at "the end" of a specified time period. Summative assessment data such as PISA are often used for comparative purposes (e.g., country to country). Summative assessment data have minimal ability to improve academic achievement for the students on which it is based. For many students, "assessment has become synonymous with numbers and grades" that report only their overall performance because of the limits of the summative approach (Hattie, 2017, p. xviii). Formative assessment, on the other hand, can significantly improve students' learning because it provides data for the teacher and students to make adjustments in an immediate time frame. It stresses fast and specific teacher feedback to students while they are still thinking about their work. The focus of formative assessment is to enhance learning for each student (Stiggins, 2010).

Formative assessment takes place during instruction; is ongoing, dynamic, and not used for grading. It is viewed as assessment for learning. For students, formative assessment answers the question "How am I doing?" (Chappuis & Chappuis, 2008). In comparison, summative assessment is viewed as assessment of learning by documenting how much knowledge has been demonstrated by the summation (end) of a time period (Popham, 2014). Summative assessment provides students with answers to the question "How did I do?" and is often used for grading purposes (McMillan, 2014).

## ***2.0 The Basics of Teacher-Driven Classroom Formative Assessment***

Students' learning and, thus, their academic achievement can be significantly increased by teachers utilizing the formative assessment process. Assessing student performance based on learning targets and making instructional adjustments during a daily lesson are the cornerstones of meaningful formative assessment. These instructional adjustments by teachers pertain to content, students' learning styles, and take into consideration the specific needs of each student. Formative assessment includes teachers providing students with specific feedback as to what needs to be corrected and how, while also taking into consideration students' perceptions of the situation. This day-to-day "checking for understanding" to determine if students are mastering the skills the teacher is addressing is crucial to enhancing student learning and maximizing academic achievement (Fisher & Frey, 2014). Formative assessment provides students with information to answer three questions: (1) Where am I going?, (2) How am I going to get there?, and (3) Where to next? (Hattie, 2003, p. 2). It is important for teachers to remember that some students may need multiple opportunities to master content (Moss, 2013).

It is essential that formative assessment criteria are linked to learning targets and understood by students. These learning targets break down a content goal in a subject area such as mathematics into a "learning progression" of a logical sequence of content representing skills students need to master in order to attain that content goal. A series of content goals is usually anchored to a learning standard (larger entity) that represents an essential content component of a subject matter area. In mathematics, for example, a series of content goals might compose a learning standard labeled critical thinking for problem solving.

It is crucial that formative assessment results, based on the learning targets, provide specific feedback to students about their performance. As the teacher progresses with instruction, a student's learning gap—actual performance compared to learning targets and mastering the content goal—should progressively become smaller until the gap is closed. This means that the content goal has been mastered. This is similar to Bloom's Feedback-Correction-Processing Model (Bloom, 1976; Bloom 1984).

With formative assessment teachers design instructional strategies, including ways to present the content through a learning progression, linked to the skills composing learning targets for specific students. Teachers are continuously making decisions regarding: (a) identifying which students are struggling and need immediate help, (b) ascertaining if they need to modify their strategies, and (c) determining if some students are not being challenged and need to move on to new content. Shepard (2000) notes the importance of teachers possessing a toolbox of varying instructional strategies for effectively meeting the needs of all students.

## ***3.0 Critical Role of Feedback in Formative Assessment***

Assessment results should not be a secret to students (Weurlander, Soderber, Scheja, Hult, & Wernerson, 2012). Teachers make numerous instructional adjustments and provide students with specific feedback that: (a) reinforces correct performance, (b) specifically identifies what needs to take place for correcting performance, (c) prompts students to reflect on what needs to be changed and why performance is not adequate, and (d) solicits students' input for ideas regarding what the teacher and they can do to improve performance. Based on students' success of moving through a learning progression, teachers need to provide enrichment activities for students who are struggling and move students who have demonstrated mastery on to new learning targets.

Through regularly checking for understanding and feedback, students become increasingly aware of how to monitor their own behaviors and understanding of the content being addressed. They learn how to reflect on their work "in the moment" and make necessary changes. Peer feedback can also serve as a helpful source for reflection (Bartz, 2017, in press).

Praise as a part of feedback to students should focus on effort, not intelligence. "You must have worked hard at these problems" represents feedback of effort. "You must be smart to correctly work these problems" focuses on intelligence. Dweck (2016a) advocates that "Praising students' intelligence gives a short burst of pride followed by a [possible] long string of negative consequences" (p. 69). This is because students may perceive that they "know it all" and there is no need to continually strive to develop and grow even more regarding intelligence. Effort aligns with what Dweck describes as a growth mindset for which students believe that personal attributes such as intelligence and personality can grow through nurturing and development. The fixed mindset assumes such attributes are set in stone and unchangeable (Dweck, 2016b).

#### **4.0 Understanding Mistakes vs. Errors in Student Performance**

Fisher and Frey (2014) indicate that it is important for teachers to understand the difference between a mistake and an error regarding student performance. Lack of attention and focus on the part of students are the major causes of mistakes. When a mistake causes negative student performance, it is often easily corrected by the teacher helping the student to understand that he/she has the wrong reference point. Subsequently the teacher aids the student in discovering why it is the wrong reference point, identifying the correct one, and determining the cause of the misunderstanding. Students commit errors because they lack the knowledge and understanding to correctly do the task at hand. Students' errors commonly fall into four categories: (1) factual errors that impact students' ability to perform accurately; (2) procedural errors that make it difficult for students to have the correct context for applying factual information; (3) transformational errors that reflect students inaccurately transferring information and the content presented by the teacher to the task at hand; and (4) misconceptions that can be caused by the teaching method utilized, prompting students to have the wrong context for the transfer or application of information to another situation. Adjustments to content, instruction, or both must be quickly dealt with by the teacher for each category so students' performance can get back on track and the desired learning progresses (Fisher & Frey, 2014).

#### **5.0 The Important Function of Effective Questions**

Three basic types of questions that teachers use are: (1) questions formulated in the proper context and purpose such that they are likely to elicit information needed to judge a student's performance against a present criterion, (2) questions that serve for recalling information, and (3) questions that require students to apply information in a unique way (Fisher & Frey, 2014). For all three types of questions, it is important for the teacher to match them with specific learning targets. After an initial question, a teacher may need to use probing follow-up questions to cause students to develop deeper insights of the specific knowledge and skills needed to meet the learning target. In most situations, closed questions that can be answered by a single response (e.g., yes or no) should be avoided (McMillan, 2014).

Proper *wait time*—giving students sufficient time to process information—by teachers is necessary for each of the three question types (Fisher & Frey, 2014). Student *hand raising* as a method for teachers checking the general understanding of the class will not provide accurate results of student knowledge because high achievers are more likely to volunteer than underachievers. A more effective approach is to sample so that feedback is gained from a high achieving student, an average student, and an underachieving student (William, 2016). Electronic student response systems (e.g., clickers) are useful for simultaneously checking the understanding of all students (Greenstein, 2010).

Students need to be adept at asking germane questions. Just as the teacher utilizes different types of questions, students need to do the same. It is beneficial for students to know how to use a series of questions to “drill down” for more in-depth understanding of a concept and its application.

#### **6.0 Technology-Assisted Formative Assessment**

The formative assessment process is *labor intensive* for teachers because of all the planning necessary and the need to continuously observe students' interactions with the content and their teaching strategies. Teachers must also consistently engage in *purposeful reflection* regarding adjusting strategies (Black & Williams, 1998). Effective supplementation through the use of technology has the capability of making formative assessment even more effective, while lightening the teacher's workload. As Russell (2010) notes “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 individualization of formative assessment” (p. 135).

Commercially developed computer-based instructional programs can be helpful learning supplements for students and provide time saving assistance for teachers. These programs provide learning cues and tutoring feedback to students. They indicate how individual students respond to problems and how much support they need from the program to generate correct responses through continuous assessment feedback. These computer-based instructional programs are often advertised to furnish detailed diagnostic reports for helping teachers in adjusting instruction for individual students. The tagging technique used by some teachers serves as a good example of how technology can aid them.

Tagging is an approach used with formative assessment by some teachers to voluntarily make “public” (share) variations in student thinking so students can provide feedback and learn from each other (Duckor & Holmberg, 2017). Technology in the form of interactive smart boards, tablets, or other digital devices can increase student participation, engagement, and motivation when matched with tagging activities.

Computer-based technologies hold great promise to enhance formative assessment practices (Russell, 2010). However, the teacher must decide when and how best to use each technology in the formative assessment process (Duckor & Holmberg, 2017). It is also necessary to consider the costs and training needed to implement each technology.

### **7.0 Benchmarks as an Interim Assessment**

A benchmark assessment is initially given as a baseline measure or pretest at the start of the school year. Some assessment experts such as Shepard (2014) and Popham (2014) refer to this type of assessment as *interim*, meaning between true formative assessment and summative assessment in a time context. Interim assessments are generally given multiple times during the school year through administration taking place at a prescribed time for all students.

A benchmark assessment gives feedback to the teacher—and sometimes to the student depending on the particular commercially used assessment—by reporting the degree of progress of each student in achieving mastery for learning targets and goals. In addition to the baseline start of year pretest, several additional benchmark assessments are usually spaced throughout the school year, with the final assessment given near the end of the year. The last benchmark can serve as a posttest and is then considered a summative assessment. The initial benchmark assessment (pretest) and the last (posttest) can be used to measure yearly gains for students and provide data for teachers’ effectiveness if such data are included in a teacher evaluation system.

These benchmark assessments furnish feedback to the teacher on each student’s progress on learning targets, goals, and standards; as well as aggregate data for the class. Some commercially developed benchmark assessments also link results to curriculum materials. A major challenge for teachers is deciding when and how to integrate benchmark assessment results into daily classroom use. The cost and time taken from instruction must also be considered.

### **8.0 Concluding Thoughts**

The formative assessment process has tremendous potential for enhancing student learning and, thus, academic achievement. Teacher-driven formative assessment is linked to learning targets, its results are shared with students, and teachers use it to determine students’ academic progress and to adjust instruction and curriculum content. Without knowing the results (feedback) of formative assessment, students are left to guess or use the very inefficient approach of trial-and-error to judge their progress. It is imperative to understand that feedback is at the heart of formative assessment, and will help teachers to modify instruction and content in order to make necessary adjustments to improve each student’s learning. Effective formative assessment requires very talented, dedicated, and hardworking teachers who know how to build positive teacher-student relationships and who are excellent communicators. A school’s culture should build the formative assessment process into the daily activities of each teacher. The school’s administrators must support formative assessment and provide teachers with ample training and times to interact with each other to identify best practices for its effective implementation. This training must be personalized to the needs of each teacher and its effectiveness evaluated (Brink & Bartz, 2017).

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