

AssessToday Observation Instrument

A clear distinction is made between formative and summative assessment. Formative assessment permits learners to take risks and try new things without threat or fear of sanctions, and provide descriptive feedback. Summative assessments are when learners know it's time to be accountable. Wiliam and Thompson (2007) identified three types of formative assessment as long, medium, and short cycles. Long cycles of formative assessment span across grading periods, semesters or year. Most formative assessments of this type are informing instruction for the course instead of the students. Medium cycles of formative assessment occur for a unit of study. This could assist informing teacher's future instruction of the gaps that are still prevalent in student understanding that may need to be addressed in future units of study. Short cycles of formative assessment span from within one period of instruction up to two days. This cycle attends to student's understanding of the content at the time the instruction is occurring.

The *AssessToday Observation Protocol* refers to a teachers' use of short-cycle formative assessment during instruction. This handbook provides literature background, descriptions, and the instrument for teacher's use of formative assessment.

What does AssessToday Measure?

AssessToday measures teacher's use of short-cycle formative assessment. In order to design an observation instrument that would evaluate short-cycle formative assessment, the following definition by Black and Wiliam (2009) was utilized. It states:

Practice in a classroom is formative to the extent that evidence about student achievement is elicited, interpreted, and used by teachers, learners, or their peers, to make decisions about the next steps in instruction that are likely to be better, or better founded, than the decisions they would have taken in the absence of the evidence that was elicited (p. 6).

Short-cycle formative assessment includes actions that are observable during one class-period of instruction or content area of instruction. For example, a high school teacher teaching algebra may have a class period that lasts 90 minutes while a third grade teacher teaching multiplication may have 30 minutes of mathematics instruction. An extension of the observation could include interviews or artifacts but is not part of this observation instrument.

Who is the Target Population for AssessToday?

In-service mathematics and science secondary teachers were the targeted population for determining reliability and construct validity. Other populations could be considered given that the instrument is validated for these additional populations.

Why AssessToday?

A decade of high stakes testing as mandated by the No Child Left Behind Act (2000) has not resulted in the improvement of student achievement in mathematics or science. In fact, National Assessment of Educational Progress (NAEP) scores for mathematics and science have flat-lined since 2000 (Department of Education, 2008) and Trends in International Mathematics and

Science Study (TIMSS) data places US students 19th among the 40 nations tested. Presently, only 65% of 8th grade students in the US score at or above the basic level in mathematics and science understanding (Phillips, 2007). Clearly, there exists a need to improve the performance of students as they prepare to compete in an increasingly global society. Slavin (1996) and Black (2001) suggest that student achievement will only be changed when teachers adopt more effective instructional methods. For this reason, a focus on formative assessment is needed if we are to break free from the cycle of testing and adopt practices that adjust teaching and learning in ways that will achieve intended instructional outcomes.

What are the intended inferences to be made from AssessToday scores?

Researchers suggest high quality formative assessment is a high leverage practice used to improve student learning and achievement. AssessToday scores are used for purposes of increasing the frequency and quality of formative assessment for a single construct, multiple constructs, or across all seven constructs during day-to-day instruction.

What purposes are the scores intended to serve?

Teacher scores for each formative assessment construct can be used to develop individualized plans for improving the frequency and quality of short-cycle formative assessment used in the classroom. The intent is observers who are experts in the content for which they were observing would conduct the observations. A teacher may use these scores for purposes of reflection and self-improvement. Principals, instructional coaches, and other administrators may use these scores to externally assess the use of short-cycle formative assessment for a classroom teacher. The focus of short-cycle formative assessment is to create learning environments characterized by immediate feedback and instructional adjustments that promote learning.

Initial teacher scores are used to benchmark teacher use of formative assessment across the seven constructs. These scores are in turn used to identify and prioritize professional development for individual teachers as well as school-wide professional development over the academic year. Meaningful interpretation of individual teacher scores can only be derived from multiple observations over the academic year.

Constructs for the AssessToday

Considering the definitions and the review of literature on formative assessment, seven constructs are included in the AssessToday observation instrument. The seven constructs are: learning target, question quality, nature of questioning, self-evaluation, observation of student affect, instructional adjustments, and evidence of learning. The specific wording of the seven constructs was selected in order to meet two important goals. The first goal was to design an instrument that could be used by researchers or practitioners in any classroom situation. Since it is an observation instrument, the constructs were limited to actions observable during one period of instruction usually 45-90 minutes. The second goal in the design of the instrument was to use wording that was familiar to both researchers and educators. A clear description of each of the constructs and their indicators is described below.

Core Constructs of Formative Assessment	Novice	Apprentice	Practitioner	Master
Learning Target	Zero or one of the indicators is observed during the class period.	Two of the four indicators are observed during the class period.	Three of the four indicators are observed during the class period.	Teacher states, writes and restates objective(s) throughout the lesson. Students write down the learning target(s).
Question Quality	Teacher does not use questions effectively during instruction.	Teacher rarely uses questions effectively to scaffold instruction.	Teacher generally uses questions effectively to scaffold instruction.	Teacher consistently and appropriately uses questions effectively to scaffold instruction.
Nature of Questioning	Teacher does not use wait time and questioning effectively during instruction.	Teacher rarely uses wait time and questioning effectively to diagnose problems with learning and improve instruction.	Teacher generally uses wait-time and questioning effectively to diagnose problems with learning and improve instruction.	Teacher consistently and appropriately uses wait-time and questioning effectively to diagnose problems with learning and improve instruction
Self-evaluation	Teacher does not use student self-evaluation strategy(ies) or tool(s) during instruction.	Generic self-evaluation strategy(ies) or tool(s) were employed but not explicitly tied to the regulation and improvement of student's self-learning.	Teacher provides the strategies or tool(s) students use for self-evaluation during instruction in an effort to regulate and improve the student's self-learning. Self-evaluation strategies or tools are primarily teacher-driven and could include techniques such as the use of traffic lights, checklists, rubrics, drawings, a self-assessment inventory, journaling, and/or reflection statements.	Student uses a variety of strategy(ies) and tool(s) to self-evaluate in an effort to regulate and improve their own learning. These could include student-designed strategies and tools such as traffic lights, checklists, rubrics, drawings, a self-assessment inventory, journaling, and/or a reflection statement.
Observation of Student Affect	Teacher does not attend to how feedback is received by the student. Total emphasis is on teaching specific content. Few students are active learners who rarely interact.	Teacher shows limited sensitivity to student affect and tailors feedback for only a few students. Most emphasis is on teaching specific content. Some students are active learners who infrequently interact.	Teacher is sensitive to the affect of most students and shows general evidence of balancing teaching content with affect. Many students are active learners whose interactions are developing.	Teacher is sensitive to student affect, collects evidence through body language, facial expressions, and/or class work, and adjusts instruction accordingly. Teacher demonstrates expertise and polish in balancing content with student affect. Students are active learners who regularly interact.
Instructional Adjustment	No adjustments to instruction are observed.	Teacher uses minimal adjustments during instruction.	Teacher predominately and effectively uses adjustments during instruction.	Teacher consistently and effectively uses adjustments during instruction.
Evidence of Learning	There is minimal evidence that learning occurred. There is evidence of learning for few of the students for the following indicators: all-student responses, individual responses, and artifacts of learning.	There is episodic evidence that learning has occurred. There is evidence of learning for some of the students for the following indicators: all-student responses, individual responses, and artifacts of learning.	There is evidence of learning for many of the students for the following indicators: all-student responses, individual responses, and artifacts of learning.	There is evidence of learning for almost all of the students for the following indicators: all-student responses, individual responses, and artifacts of learning

I. Learning Target

The first construct, Learning Target, is important for clearly communicating the purpose of the lesson, so that students know what they are learning and the criteria for success. Leahy, Lyon, Thompson, and Wiliam (2005) place clear learning targets as the first priority in the list of “nonnegotiable” strategies for effective classroom use of formative assessment (p. 20). This is supported in the research literature by Black and Wiliam (2009). Chappuis (2009) mentions if teachers do not begin with clear and understandable learning targets, there is no way to design sound assessments. If teachers are going to use formative assessments to assist their students in the learning process, they must have a target in mind and know how they are going to achieve the target. Brookhart, Moss, and Long (2008) argue that clear learning goals give students ownership of their learning and increases a student’s motivation in the classroom. The authors emphasize the importance of connecting classroom feedback to the established learning targets. This provides students with appropriate scaffolding as they progress towards the objective of the lesson.

Shepard (2005) stresses the importance of learning targets as students learn how to use self-assessment. She suggests teachers should provide students with rubrics that will inform students of the specific criteria expected of them throughout the learning process. This helps the students learn metacognition and to “internalize the standards” as they compare their work with the description and expectations written on the rubric (Shepard, 2005, p. 69).

Indicators for the Learning Target construct. The process of formative assessment begins with identifying the learning goals (Heritage, 2010). The goals, or learning targets, are placed before the students as learning criteria for the day’s learning activities. If students are going to be cognizant of the learning goals for the day, several strategies of communicating those goals should be employed. Not only should teachers state the learning goals for the day verbally, but it is a good idea to write them on the board for students to see during instruction and for students to write them down also. As teachers provide feedback during the lesson, students are reminded of where they are going and refocus their learning efforts on the intended learning target(s) for the lesson. Therefore the learning target(s) must match the lesson that is actually taught. If this initial criterion is met then four actions can be observed during instruction that will indicate whether the Learning Target construct has been thoroughly established:

1. Teacher stated the learning target(s).
2. Teacher wrote the learning target(s) for students to see.
3. Students wrote down the learning target(s).
4. Teacher revisited the learning target(s) throughout the lesson.

The learning targets, therefore, are critical for the use of formative assessment in the classroom. Learning targets are the driving force of the days’ activities and one of the motivating factors for student learning. When teachers provide clear targets, students are able to self-assess in such a way as to keep their learning moving forward. The learning targets also provide a framework for feedback, which is also a crucial construct of formative assessment.

Following is a more detailed description of the Learning Target construct and the indicators that define each of the four levels.

Master – Learning Target matches the lesson. All four indicators are observed during the class period.

The teacher's learning target is effective because all four of the indicators were observed:

- Teacher states learning target(s).
- Teacher writes learning target(s) for students to see.
- Students write learning target(s) for themselves (80-100% of students).
- Teacher revisits the learning target(s) throughout the lesson.

Practitioner – Learning Target matches the lesson. Three of the four indicators are observed during the class period.

The teacher's learning target is mostly effective because three of the following indicators were observed:

- Teacher states learning target(s).
- Teacher writes learning target(s) for students to see.
- Students write learning target(s) for themselves (80-100% of students).
- Teacher revisits the learning target(s) throughout the lesson.

Apprentice – Learning Target matches the lesson. Two of the four indicators are observed during the class period.

The teacher's learning target is somewhat effective because only two of the following indicators were observed:

- Teacher states learning target(s).
- Teacher writes learning target(s) for students to see.
- Students write learning target(s) for themselves (80-100% of students).
- Teacher revisits the learning target(s) throughout the lesson.

Novice – Learning Target matches the lesson. None or one of the indicators is observed during the class period.

The teacher's learning target is ineffective because zero or only one of the following indicators were observed:

- Teacher states learning target(s).
- Teacher writes learning target(s) for students to see.
- Students write learning target(s) for themselves.
- Teacher did not revisit the learning target(s) throughout the lesson.

II. Question Quality

Questioning is one of the most basic, yet a very effective method used by teachers to gain information, stimulate participation, and challenge thinking (Black & Harrison, 2001; Korkmaz, 2009). Many researchers (Black & Harrison, 2001; Hannel, 2009; Rowe, 1986; Taba, 1966; Tienken, Goldberg, & DiRocco, 2009) have studied the effects of questioning in the classroom and agree that questioning is a crucial component in the teaching process. Levin and Long (1981) indicate that teachers ask about 300 to 400 questions in any given day. Questions check for understanding, test knowledge of basic facts, diagnose student difficulties, and assist with classroom management. Wilen and Clegg (1986) state that questioning is “The most influential single teaching act because of the power of the question to impact student thinking and learning” (p. 153). They suggest too that there are two components at work in classroom discourse: the questions and the questioning. According to Black and Harrison (2001), the questions asked in the classroom are most effective when teachers are mindful of the quality of the questions and nature of questions.

The quality of a teacher’s questions can influence the degree to which students are able to recall prior knowledge and extend their thinking through scaffolding (Chin, 2006). Teacher questioning that elicits information about students’ understanding and encourages classroom discourse is an essential element in developing students’ learning of content.

Open-ended questioning. An important indicator of good questioning is the use of open-ended questions (Korkmaz, 2009). Open-ended questions seek creativity, encourage problem-solving, and might have multiple correct answers. Open-ended questions allow students the freedom to solve problems in new and innovative ways and discover unique problem solving strategies (Erdogan & Campbell, 2008). These types of questions also encourage class discussion and lead students into higher-level reasoning, critical thinking, and evaluation. Almeida (2010) discusses the importance of using a “dialogical approach” to questioning (p. 589). The dialogical approach to questioning encourages dialog between teacher and student, and between students. This open-ended strategy encourages discussion where the teacher becomes a facilitator rather than a source for all questions to be asked and answered. Chin (2006) suggests that “students can be stretched mentally through sensitive teacher-led but not teacher-dominated discourse” (p. 1343).

Bloom’s high and low order questions. The second indicator of good questioning is based on an established hierarchy of cognitive levels as described by Bloom (1956). Although Bloom was not writing about questioning, per se, his cognitive taxonomy does apply to the layered structure of questioning (Hannel, 2009). Redfield and Rousseau (1981) suggest that the low-cognitive-level questions correspond to the lower levels of Bloom’s taxonomy and the high-cognitive-level questions correspond to the higher levels within the taxonomy. Shiman and Nash (1974) suggest teachers do not necessarily need to follow a linear progression of Bloom’s cognitive levels, but rather effective questioners move freely and efficiently between levels, both reinforcing facts and encouraging critical thinking and metacognition.

Prior knowledge. For questioning to be effective, a students’ prior knowledge and the teacher’s scaffolding “grain size” must be consistently aligned (Popham, 2008, p. 33). Vygotsky (1962) addressed this issue in his discussion of the zone of proximal development. Teachers

must challenge students to move from what they know to what they are capable of knowing. The grain size is crucial in completing the feedback loop that increases understanding and achievement (Sadler, 1989).

Three actions can be observed during instruction that will indicate whether the Question Quality construct has been thoroughly established:

1. Open ended questioning – Uses both closed and open questioning strategies, but generally uses open-ended questioning.
2. Bloom’s high and low order questions – Teacher uses appropriate levels of high and low order questions during instruction as determined by the learning target(s) most of the time. Some essential questions are generated and generally match Bloom’s level to the learning target(s).
3. Prior knowledge - Teachers’ expectation of prior knowledge and students’ ability to scaffold learning from prior knowledge are mostly aligned. Learning grain size is mostly appropriate for effective learning.

Following is a more detailed description of the Question Quality construct and the indicators that define each of the four levels.

Master – Teacher consistently and appropriately uses multiple, varied, and differentiated questions to scaffold instruction.

- *Open ended questioning* – Teacher consistently and appropriately uses open-ended questions that challenge students to think critically during instruction.
- *Bloom’s high and low order questions* – Teacher uses appropriate high-level and low-level questioning throughout the entire lesson cycle. The combination of the questions is aligned with the learning target(s). Evidence of planning essential questions related to instructional learning target is present. Teacher consistently and appropriately matches Bloom’s levels to the learning target(s) and/or standards.
- *Prior knowledge* – Teacher’s expectation of prior knowledge and student ability to scaffold learning from prior knowledge are appropriately aligned. Learning grain size is appropriate and effective for learning.

Practitioner – Teacher generally uses questions effectively to scaffold instruction.

- *Open ended questioning* – Uses both closed and open questioning strategies, but generally uses open-ended questioning.
- *Bloom’s high and low order questions* – Teacher uses appropriate levels of high and low order questions during instruction as determined by the learning target(s) most of the time. Some essential questions are generated and generally match Bloom’s level to the learning target(s).
- *Prior knowledge* - Teachers’ expectation of prior knowledge and students’ ability to scaffold learning from prior knowledge are mostly aligned. Learning grain size is mostly appropriate for effective learning.

Apprentice – Teacher rarely uses effective questions to scaffold instruction.

- *Open ended questioning* – Some use of open-ended questioning is observed, but closed-ended questioning is the predominant questioning technique observed.
- *Bloom’s high and low order questions* – Relies on lower-order recall questions, but episodic use of higher-level questioning is observed. Teacher occasionally uses appropriate levels of questioning during instruction as determined by the learning target(s).
- *Prior knowledge* – Teachers’ expectation of prior knowledge and student ability to scaffold learning from prior knowledge are somewhat aligned. Learning grain size is still too large for effective learning.

Novice – Teacher did not use questions effectively during instruction

- *Open ended questioning* – Almost exclusive use of closed-ended questions is observed.
- *Bloom’s high and low order questions* –Teacher did not use appropriate levels of questioning during instruction as determined by the learning target(s). Focus on higher order thinking questions when only lower order was warranted or vice versa.
- *Prior knowledge* – Teachers’ expectation of prior knowledge and student ability to scaffold learning from prior knowledge are not aligned. Learning grain size is too large for effective learning.

III. Nature of Questioning

In addition to question quality, the nature of questioning is also important in effecting classroom discourse (Black & Harrison, 2001). Wilen and Clegg (1986), point out that the nature of questioning should include wait time and the questions that follow student responses.

Wait time. Researchers have also reported the importance of wait time during the questioning process (Almeida, 2010; Rowe 1974, 1986). The amount of time a teacher allows for student thinking and reflection is essential to the learning process. A study by Rowe (1974) found that teachers waited, on average, less than one second for a response. After that time, the teacher would either repeat the same question or call on a student for an answer. Rowe (1986) completed a follow-up study on teachers trained to wait 3-5 seconds before intervening. Student response improved dramatically, and there was much more evidence of student learning and thinking. Wait time of this length is useful in discussion formats and gives greater confidence to students when they respond. There are four positive effects on student learning and three positive effects on teachers. The positive effects on students included an increase in the length of their responses, greater participation, greater confidence, and fewer discipline problems. For teachers, the positive effects included a greater ability to be flexible in the classroom, an increased ability to ask appropriate questions, and higher expectations for student success.

Follow-up questioning. Good questioning skills in the classroom include follow-up questions. Multiple follow-up questions can diagnose specific areas of difficulty and give teachers a clearer idea of what corrective might be needed (Hannel, 2009; Shiman & Nash, 1974). Shiman and Nash (1974) discuss what they refer to as the “contextual questioner” (p. 250). The contextual questioner asks both factual and conceptual questions, moving effortlessly

between the two using multiple follow-up questions. During the follow-up questioning, the questioner looks for the moments of breakthrough and capitalizes on those learning opportunities. Hannel (2009) suggests that teachers should create a classroom environment that is conducive to questioning. Students should expect to be asked questions daily and the teacher should give every student the opportunity to justify and elaborate on the answers they give.

Follow-up questions also focus students' attention to specific areas the teacher wants to emphasize. Probing is another questioning strategy. It encourages higher cognitive thinking and is effective to use when students are not accustomed to thinking or responding at higher cognitive levels. Students may answer questions with low-cognitive, one word answers and follow-up questions help students to clarify, justify, and expand their initial responses (Wilén & Clegg, 1986).

Two actions can be observed during instruction that will indicate whether the Nature of Questioning construct has been thoroughly established:

1. Wait time – Teacher consistently uses appropriate wait time (3-5 seconds) to respond to students after a question has been asked.
2. Follow-up questioning – Teacher consistently and appropriately uses multiple questions to diagnose and/or scaffold instruction.

Following is a more detailed description of the Nature of Questioning construct and the indicators that define each of the four levels.

Master – Teacher consistently and appropriately uses wait time and questioning to diagnose problems with learning and improve instruction.

The teacher's questioning is effective because the majority of the class time that was observed indicated the following:

- *Wait time* – Teacher consistently uses appropriate wait time (3-5 seconds) to respond to students after a question has been asked.
- *Follow up questioning* – Teacher consistently and appropriately uses multiple questions to diagnose and/or scaffold instruction.

Practitioner – Teacher generally uses questioning effectively to diagnose problems with learning and improve instruction.

The teacher's questioning is mostly effective because the majority of the class time that was observed indicated the following:

- *Wait time* – Teacher uses appropriate wait-time (3-5 seconds) to respond to students after a question has been asked most of the time.
- *Follow up questioning* – Teacher uses questions 3 – 4 times during instruction to follow responses to their questions or students' questions during instruction to diagnose and/or scaffold instruction. The follow-up questioning follows a logical progression from low-level to high-level in order to gain information from students, to stimulate thinking and appropriately scaffold learning.

Apprentice – Teacher rarely uses effective questioning to diagnose problems and improve instruction.

The teacher's questioning is somewhat effective because the majority of the class time that was observed indicated the following:

- *Wait time* – Teacher occasionally uses appropriate wait-time (3-5 seconds) to respond to students after a question has been asked.
- *Follow up questioning* – Teacher use questions during instruction to follow responses to their questions or students' questions during instruction to diagnose and/or scaffold instruction. However, the questions do not seem to have a significant contribution to the learning.

Novice – Teacher did not use questioning effectively during instruction

The teacher's questioning is ineffective because the majority of the class time that was observed indicated the following:

- *Wait time* – Teacher waits one second or less to respond to students after a question has been asked or answers their own questions.
- *Follow up questioning* – Teacher did not use questions to follow responses to their questions or students' questions during instruction.

IV. Self-evaluation

In the classroom it is important for students to become owners of their own learning (Leahy et al., 2005, Wiliam, 2010). This can be accomplished as students gain information about themselves through self-assessment (Black & Wiliam, 2009; Sadler, 1989). Andrade (2010) describes self-assessment as a process where students reflect on the quality of their own work, compare it with the stated objective, and make revisions as needed.

Teachers can improve self-assessment practices by encouraging students to reflect on their own learning through such techniques as "traffic lights", (a self-assessment technique where students display green, yellow, or red cards to indicate their level of understanding (Black et al., 2003, p. 22)), a self-assessment inventory, journaling, and/or a reflection statement (Black et al., 2003; McMillan, 2010; Popham, 2008).

Hattie and Timperley (2007) suggest that the ideal learning situation is obtained when both teacher and student use feedback to answer the three crucial questions of classroom feedback: "Where am I going? How am I doing? and Where to next?" (p. 88). Teachers should encourage students to use self-evaluation to answer these critical questions during the instruction time. On the other hand, students should become self-regulated learners who automatically ask themselves these questions as they are in the process of learning. Through this process students learn to determine what they need to do to move their learning forward (Heritage, 2007).

Shepard (2000) suggests that self-assessment increases students' responsibility for regulating their own learning and helps the relationship between teacher and student be more collaborative. Heritage (2007) agrees and suggests that students and teachers should develop a shared understanding of the student's current development. This encourages students to take ownership for their learning and view the classroom as a safe place to take risks. Also, students

become more interested in classroom practices, have longer attention spans, and behave more appropriately in the classroom. Students who self-assess understand the criteria of achievement and are more likely to master the objectives of the lesson. As a result, the main indicators for self-evaluation include student initiating self-evaluation, self-evaluation strategies and tools, and student action.

Student Initiates Self-evaluation. The instructor models various strategies and/or tools that are designed to facilitate self-evaluation on the part of the student. This is based on theory of Observational Learning (Bandura, 1986). According to this theory, the individual must first pay *attention* to stimuli in the environment. Next, the stimuli must be coded in order to be *stored in memory*. For example, repetition, self-verbalization, and/or linking new information to existing knowledge already stored in memory lead to acquisition of new behaviors. Finally, it is the process of production that leads to the expression of an observable behavior. The process of Production provides evidence that observational learning is actually taking place and only occurs only when sufficient *motivation* is present to cause the individual to display a learned behavior.

Self-evaluation Strategy (ies) and Tool(s). Equally important is the ability of the student to engage in the process of goal setting in order to understand the learning target. Furthermore, the learning target must be characterized as neither too easy nor too hard. Goal setting is particularly important with regard to long-term tasks. Breaking up the long-term task into shorter, more manageable tasks helps students to progress through a series of subtasks that will provide assistance in the completion of the larger task.

Student Action. “Self-judgment” is comparing present performance with the learning target (Schunk, 2009, p. 131). Feedback on performance may come from tools such as rubrics developed by the student or teacher, from peers, or from other more knowledgeable persons such as the instructor. It is important that students judge their movement toward the learning target as adequate, or in the case of negative evaluation of progress, they must think they are capable of doing something to improve their progress. If students think they lack the ability to succeed or improve, then they will abandon the learning target.

Three actions can be observed during instruction that will indicate whether the Self-evaluation construct has been thoroughly established:

1. Student initiates self-evaluation - Students instead of the teacher initiates self-assessment strategy (ies) and tool(s) during instruction.
2. Self-evaluation strategy (ies) and tool(s) -) – Students select strategy(ies) and tool(s) that are clearly defined and relate to the learning target(s).
3. Student action - Students understand how to assess their own learning and are able to use the strategies to assess their own learning. Students continually use self-assessment strategies throughout the lesson in order to maximize learning.

Following is a more detailed description of the Self-evaluation construct and the indicators that define each of the four levels.

Master – Teacher uses a variety of strategies to encourage students to self-evaluate in an effort to regulate and improve their own learning. These could include techniques such as the use of traffic lights, a self-assessment inventory, journaling, and/or reflection.

- *Student initiates self-evaluation* – Students instead of the teacher initiates self-assessment strategy(s) and tool(s) during instruction.
- *Self-evaluation strategy(s) and tool(s)* – Students select strategy(s) and tool(s) that are clearly defined and relate to the learning target(s).
- *Student action* – Students understand how to assess their own learning and are able to use the strategies to assess their own learning. Students continually use self-assessment strategies throughout the lesson in order to maximize learning.

Practitioner – Evidence of one self-evaluation strategy or tool is used during instruction in an effort to regulate and improve the student’s self-learning.

- *Teacher initiates self-evaluation* – Teacher uses at least one self-assessment strategy or tool during instruction for improving student learning.
- *Self-evaluation strategy(s) and tool(s)* – The strategy or tool is designed by the teacher and is clearly described and relates to the learning target(s).
- *Student action* – Students understand how to self-assess their own learning and use self-assessment strategies designed by the teacher to assess their learning. This may be observed by a variety of student interactions such as student-student or student-teacher.

Apprentice – Generic self-evaluation strategy(s) or tool(s) was employed but not explicitly tied to the regulation and improvement of student’s self-learning.

- *Teacher initiates self-evaluation* – Teacher encourages students to evaluate their own learning during instruction, but in a very generic, unorganized, and/or not used for improving students’ learning.
- *Self-evaluation strategy(s) and tool(s)* – The strategy(s) or tool(s) for self-evaluation is not clearly described or generic.
- *Student action* – Students seem unsure of how to self-assess their learning. This may be observed by a variety of student interactions such as student-student, student-teacher.

Novice – Teacher does not use student self-evaluation strategy or tool during instruction.

- *Teacher initiates self-evaluation* – The teacher did not explicitly encourage students to evaluate their own learning.

- *Self-evaluation strategy(s) and tool(s)* – The teacher does not provide strategy(s) or tool(s) for self-evaluation.
- *Student action* – Students may evaluate their own learning, however, the teacher does not use or is not aware that students are using self-evaluation in the classroom.

V. Observation of Student Affect

Teachers must be cognizant of how their students are receiving instruction (Cauley & McMillan, 2010). Much can be learned from students by observing their body language, facial expressions, and quality work. Stiggins (2010) points out that the successful use of formative assessment is not merely quality assessment and appropriate instructional adjustments, but also includes careful management of the emotional state of students. Popham (2005) suggests that student affect is essential to teachers since attitudes, interests, and feelings of students influences classroom behavior and engagement. These student affect behaviors are components in any accountability strategy for education. Bell and Cowie (2001) suggest that formative assessment practice by teachers “is more than just an intellectual and professional activity; the feelings of teachers and students are centrally engaged” (p. 45). Sensitivity to student affect in the classroom supports student’s motivation and self-esteem (Black & Wiliam, 2004). It also encourages students to take control of their own learning. Ownership of learning increases motivation, self-efficacy, and self-regulation (Brookhart, 2008; Miller & Lavin, 2007).

Heritage (2010) posits that what classrooms really need is a culture that is collaborative and supportive. She suggests shared responsibility between the teacher and all students, a classroom where risk taking occurs freely and frequently, and an environment that is characterized by mutual trust among teachers and students. Lave and Wenger (1991) refer to this classroom culture as a community of practice and suggest students will work harder to become more competent members of the group when teachers and students have shared responsibilities. Student affect plays an important role in formative assessment. Achievement will increase when teachers effectively interpret student affect behaviors to maximize opportunities for improvement. There are four primary indicators that are observable in the classroom context that communicate information about student affect, student behavior, teacher’s behavior, instructional focus, and student interactions.

Student Behavior. Student behavior includes the degree of student responsiveness to teacher’s questioning, the amount of classroom engagement, indications of critical thinking, and display of confidence (Popham, 2005). Students will exhibit these behaviors even when persisting through difficult tasks (Shepard, 2000). This is the result of students trusting the teacher, which leads the next indicator of the teacher’s behavior.

Teacher Behavior. The second indicator, teachers’ behavior, is teachers continually taking in information both verbal and non-verbal about students’ understanding of the content (Bell and Cowie, 2001; Black and Wiliam, 2004; Brookhart, 2008). The non-verbal information includes students’ student feelings, body language and facial expressions and the verbal includes students’ written work and instructional adjustments implemented (Bell and Cowie 2001). The teacher is careful not create competition or comments that judge intellectual ability of the

students (Black and Wiliam, 2004). Comments focus on facilitating students understanding to continue development in the content.

Instructional Focus. Leahy, Lyon, Tompson, and Wiliam (2005) refer to the instructional focus being on students learning of the content rather than the execution of teaching of the content. Teachers demonstrate balance between content and being sensitive to the affective needs of students (Shute, 2008). This includes instructional practices where the teacher listens and responds to students (Black and Wiliam 2004). The teacher realizes that knowledge is not just something for students to ingest but the students must be engaged in the content in order for the knowledge to be acquired.

Student Interactions. The final indicator, student interactions, is a variety of student interactions such as student-to-student, student-to- group, and student-to-teacher, which promote learning. Interactions between students is both giving and receiving formative feedback (Leahy, Lyon, Thompson, and Wiliam 2005). Students interact with the teacher by willingly giving the teacher feedback in regards to their learning and positively receive feedback from the teacher. Teachers should actively encourage student interaction and risk taking (Shepard, 2000).

Four actions can be observed during instruction that will indicate whether the Observation of Student Affect construct has been thoroughly established:

1. Student behavior – Students are responsive to the teachers questioning and give meaningful answers that demonstrate understanding, critical thinking, and confidence.
2. Teacher behavior – Teacher is continually sensitive to almost all student feelings, body language, facial expressions, and/or class work.
3. Instructional Focus – The focus is learner-centered. Although sensitive to student affect, teacher demonstrates superb balance between teaching content and being sensitive to the affective needs of all students.
4. Student interactions – The classroom environment suggest a community of learners who regularly interact in ways that advance learning.

Following is a more detailed description of the Observation of Student Affect construct and the indicators that define each of the four levels.

Master – Teacher is sensitive to student affect, collects evidence through body language, facial expressions, and/or class work, and adjusts instructional accordingly. Teacher demonstrates expertise and polish in balancing content with student affect. Students are active learners who regularly interact.

- *Student behavior* – Students are responsive to the teachers questioning and give meaningful answers that demonstrate understanding, critical thinking, and confidence.
- *Teacher behavior* – Teacher is continually sensitive to almost all student feelings, body language, facial expressions, and/or class work.
- *Instructional Focus* – The focus is learner-centered. Although sensitive to student affect, teacher demonstrates superb balance between teaching content and being sensitive to the affective needs of all students.
- *Student interactions* – The classroom environment suggest a community of learners who regularly interact in ways that advance learning.

Practitioner – Teacher is sensitive to the affect of most students and shows general evidence of balancing teaching content with affect. Many students are active learners whose interactions are developing.

- *Student behavior* – Students are responsive to questioning, generally giving answers that demonstrate understanding.
- *Teacher behavior* – The teacher makes an effort to be sensitive to more than half of students' feelings, body language, facial expressions, and/ or response to class work.
- *Instructional Focus* – The focus is learner-centered based on the content. However, the teacher has not mastered how to reach all students in the class.
- *Student interactions* – The classroom environment suggests an 'emerging' community of learners who interact in ways that advance learning.

Apprentice – Teacher shows limited sensitivity to student affect and tailors feedback for only a few students. Most emphasis is on teaching specific content. Some students are active learners who infrequently interact.

- *Student behavior* – Students may give a token response.
- *Teacher behavior* – The teacher makes some effort to be sensitive to a few students' feelings, body language, facial expressions, and/or response to class work.
- *Instructional Focus* – The focus is predominantly covering content, but the teacher only gauges the affect of a few students, usually the same 2-3 students.
- *Student interactions* – Most student interactions occur with the teacher.

Novice – Teacher does not attend to how feedback is received by the student. There is no evidence of consideration of affect. Total emphasis is on teaching specific content. Few students are active learners who rarely interact.

- *Student behavior* – Students are unresponsive and uninterested in learning.
- *Teacher behavior* – The teacher makes no effort to be sensitive to student feelings, body language, facial expressions, or lack of response to class work.
- *Instructional Focus* – The teacher's focus is only getting through the lesson.
- *Student interactions* – The teacher actively discourages student interactions.

VI. Instructional Adjustments

The key to instructional adjustments is that teachers use a different strategy for teaching than they used the first time the concept was taught (Guskey, 2007; Popham, 2008). As teachers collect evidence from their students during instruction, they analyze their current instructional strategy and decide if it is working. If students are engaged in the learning and there is evidence of their understanding the content, the current strategy is reinforced and the teacher can continue teaching with the current plan. If however, students seem confused and are becoming frustrated with the material, the teacher should make some instructional adjustment.

There are four primary components that may need to be adjusted during instruction. They include the instructional strategy, instructional timing, instructional audience, and grouping strategies.

Instructional strategies. There are a number of methods and strategies available for teachers to collect feedback from students about their learning. Formative assessment is more than just collecting evidence; it includes adjusting instruction based on that evidence (Black & Wiliam, 2009). Black and Wiliam (2009) have argued that formative assessment can inform a teacher that their strategy is better founded due to the evidence collected. Every teacher, however, needs to correct course occasionally and formative assessment is an effective tool that can help teachers decide when adjustments need to be made.

Instructional timing. The timing of the adjustment is especially important in the educational context. Guskey (2007) uses the term, “just-in-time corrections” to refer to those minor changes a teacher enacts to ensure minor problems in understanding do not become major problems later (Guskey, 2007, p. 13).

Instructional audience. The third instructional adjustment that may need to be made in the classroom is the instructional audience. The instructional audience is the set of individuals who are in need of the feedback. It might be an explanation to an individual, a small group of students, or the entire class (Black & Wiliam, 2009). It has been noticed in classroom observations that teachers may interrupt the entire class to instruct one individual who has a question. On the other hand, a teacher might have several students with the same question and choose to answer each one individually. The problem with both of these scenarios is the waste of instructional time. The teacher must make wise adjustments based on the audience that needs the corrective feedback.

Grouping strategies. An overarching strategy that may be used in instructional adjustments is the grouping arrangements of students. According to Vygotsky (1962), the social component of learning is crucial in the development and construction of knowledge. When instructional adjustments need to be made in the classroom, various grouping strategies may be employed. If groups already exist in the classroom and adjustments need to be made, the teacher may redistribute students into different groups activating a new group dynamic. Davies (2009) provides several recommendations for establishing and using groups in the classroom setting. Of significance for the use of formative assessment is that teachers should keep in mind the purpose of the grouping. Davies (2009) recommends teachers carefully construct the groups to maximize

the advantages and minimize the disadvantages of group dynamics. Because of the immense diversity in the classroom, teachers need to weigh carefully how to arrange students in order to maximize learning. Each student should be given a specific task and responsibility in the group to ensure equity, improve motivation, and create ownership. The use of groups can be very effective during the feedback-corrective loop as students learn from each other.

Four actions can be observed during instruction that will indicate whether the Instructional Adjustments construct has been thoroughly established:

1. **Instructional strategies** – Teacher makes appropriate and varied adjustments to instructional strategies based on evidence and feedback collected during instruction. Adjustment such as different strategies, providing context and models are consistently observed.
2. **Instructional timing** – Teacher constantly and consistently uses just-in-time corrections to give appropriate feedback to students at the appropriate time.
3. **Instructional audience** – Teacher maximizes instructional time and resources by addressing instructional adjustments to the appropriate audience. (i.e., individual, peer, group, or whole class).
4. **Grouping strategies** – Intentional grouping practices are noted, and group interactions are almost always on task and related to the lesson learning target(s).

Following is a more detailed description of the Instructional Adjustments construct and the indicators that define each of the four levels.

Master – Teacher consistently and effectively uses adjustments during instruction.

- **Instructional strategies** – Teacher makes appropriate and varied adjustments to instructional strategies based on evidence and feedback collected during instruction. Adjustment such as different strategies, providing context and models are consistently observed.
- **Instructional timing** – Teacher constantly and consistently uses just-in-time corrections to give appropriate feedback to students at the appropriate time.
- **Instructional audience** – Teacher maximizes instructional time and resources by addressing instructional adjustments to the appropriate audience. (i.e., individual, peer, group, or whole class).
- **Grouping strategies** – Intentional grouping practices are noted, and group interactions are almost always on task and related to the lesson learning target(s).

Practitioner – Teacher predominately and effectively uses adjustments during instruction.

- **Instructional strategies** – Teacher generally makes adjustments to instructional strategies based on evidence and feedback collected during instruction. Adjustments such as using a different strategy, providing a context and using models are observed.
- **Instructional timing** – Teacher predominately uses just-in-time corrections to give appropriate feedback to students at the appropriate time.

- *Instructional audience* – Employs efficient use of instructional time and resources most of the time, and generally engages the appropriate audience for instructional adjustments. (i.e., individual, peer, group, or whole class).
- *Grouping strategies* – Intentional grouping practices are observed, and the majority of group interactions are related to the lesson learning target(s).

Apprentice – Teacher uses minimal adjustments during instruction.

- *Instructional strategies* – Teacher makes one or two adjustments during instruction. Adjustments are loosely tied to evidence collected during instruction.
- *Instructional timing* – Teacher uses a few just-in-time corrections to give feedback to students.
- *Instructional audience* – Employs efficient use of instructional time and resources some of the time, and occasionally engages the appropriate audience for instructional adjustments. (i.e., individual, peer, group, or whole class).
- *Grouping strategies* – Grouping practices are noted, but assignment of students to a group is random. Group interaction is not strongly related to lesson learning target(s).

Novice – No adjustments during instruction are observed.

- *Instructional strategies* – Teacher makes little or no adjustments to instruction and in general is non-responsive to student mastery of learning.
- *Instructional timing* – No just-in-time adjustments are observed.
- *Instructional audience* – No consideration is given to the appropriate audience.
- *Grouping strategies* – No evidence of grouping is noted

VII. Evidence of Learning

The final construct to be observed by the AssessToday is Evidence of Learning. Evidence of learning can come from several different sources during classroom instruction.

All-student responses. One of the most common pieces of evidence used is an all-student response system (Heritage, 2010; Leahy, 2005; Wiliam et al., 2004). All-student responses are simply answers to a specific question that every student answers at the same time. Teachers can use several different methods to collect evidence of learning from the class as a whole. Wiliam et al. (2004) described the use of “traffic lights” as one technique, but many others work well also. For example, teachers may use individual white boards, multiple choice cards, or electronic devices connected to a computer to have each student display an answer at the same time.

Individual responses. Another common technique that can be used by teachers is individual responses (Black & Wiliam, 2009). Individual responses, like group responses, require that every student give a response to a question. The key ingredient is that every student receives personal attention and feedback from the teacher. Andrade (2010) argues that individual students are the best source of formative assessment feedback. When they are challenged to consider their own learning, it shifts the responsibility from the teacher onto themselves. This process helps students become self-regulated learners, increases their motivation for learning, and improves their self-efficacy.

Student artifacts. A third source of evidence for learning is student artifacts. Wiliam et al. (2004) discuss the importance of providing feedback on written work as well as providing oral feedback. The comments made on written work seem to be most effective when grades are not associated with them (Butler, 1988). Students tend to ignore the comments and place their emphasis on the grade instead. Popham (2008) strongly recommends leaving grades out of the formative assessment cycle completely. The function of formative assessment is to gather evidence of learning and adjust teaching strategies to enhance student achievement. Wiliam et al. (2004) also suggest providing feedback only and using the opportunity to increase learning. The artifacts can and should be used as instructional tools. The nature of the feedback is much more important than the amount of feedback. Complimentary phrases like, “nice job”, or critical statements like “wrong” do not provide any information that can move learning forward. Instead, suggestions for improvement or questions designed to cause rethinking are most effective.

Stiggins (2006) suggests engaging students in creating their own assessment activities similar to those that might be used as a summative score later. These assessment artifacts can be traded with peers and used to evaluate learning. This type of activity encourages students to be owners of their own learning and providing opportunities for self and peer-evaluation. Teachers can also provide useful feedback to help students ask each other valid questions and provide correct answers.

Three actions can be observed during instruction that will indicate whether the Evidence of Learning construct has been thoroughly established:

1. All-student responses – Teacher consistently and appropriately collects and uses information from the class using all-student answering techniques. (e.g., traffic lights, white boards, thumbs up).
2. Individual responses – Teacher collects and uses information from almost all the students through verbal responses related to the lesson.
3. Artifacts of learning – Almost all of the students complete an authentic assessment to demonstrate understanding. Traditional assessments are never used as the sole assessment for demonstrating understanding. When used, traditional assessments should always be paired with authentic assessments.

Following is a more detailed description of the Evidence of Learning construct and the indicators that define each of the four levels.

Master – There is evidence of learning for almost all of the students according to suggested indicators.

The following indicates high evidence of learning:

- *All-student responses* – Teacher consistently and appropriately collects and uses information from the class using all-student answering techniques. (e.g., traffic lights, white boards, thumbs up).
- *Individual responses* – Teacher collects and uses information from almost all the students through verbal responses related to the lesson.
- *Artifacts of learning* – Almost all of the students complete an authentic assessment to demonstrate understanding. Traditional assessments are never used as the sole assessment for demonstrating understanding. When used, traditional assessments should always be paired with authentic assessments.

Practitioner – There is evidence of learning for many of the students according to suggested indicators.

The following indicates moderately-high evidence of learning:

- *All-student responses* – Teacher occasionally collects and uses information from the class using all-student answering techniques (e.g., traffic lights, white boards, thumbs up).
- *Individual responses* – Teacher collects information from over half the students through verbal responses related to the lesson.
- *Artifacts of learning* – The majority of students complete an authentic assessment to demonstrate understanding. Traditional assessments are never used as the sole assessment for demonstrating understanding. When used, traditional assessments should always be paired with authentic assessments.

Apprentice – There is episodic evidence that learning occurred. There is evidence of learning for some of the students according to suggested indicators.

The following indicates moderately-low evidence of learning:

- *All-student responses* – Teacher episodically uses all-students answering techniques to collect evidence of learning.

- *Individual responses* – Teacher episodically uses individual responses to collect evidence of learning.
- *Artifacts of learning* – Student artifacts consist of worksheet type assignments and teacher monitors only for accuracy and not for understanding.

Novice – There is minimal evidence that learning occurred. There is evidence of learning for few of the students according to suggested indicators.

The following indicates low evidence of learning:

- *All-student responses* – Teacher never uses an all-student answering technique to collect evidence of learning.
- *Individual responses* – Teacher never uses individual responses to collect evidence of learning.
- *Artifacts of learning* – Student artifacts consist of worksheet type assignments, which are not reviewed for accuracy or understanding.

References

- Almeida, P. (2010). Questioning Patterns, Questioning Profiles and Teaching Strategies in Secondary Education. *International Journal of Learning*, 17(1), 587-600.
- Andrade, H. L. (2010). *Students as the Definitive Source of Culminating Demonstrations of Mastery*. In G. L. Cizek and H. L. Andrade (Eds.), *Handbook of formative assessment* (p. 90-105). New York, Routledge.
- Bandura, A. (1986). Fearful expectations and avoidant actions as coefficients of perceived self-inefficacy. *American Psychologist*, 4(12), 1389-1391.
- Bell, B., & Cowie, B. (2001). The characteristics of formative assessment in science education. *Science Education*. 85(5), 536-553.
- Black, P. (2001). Dreams, Strategies and Systems: portraits of assessment past, present and future. *Assessment In Education: Principles, Policy & Practice*, 8(1), 65-85.
doi:10.1080/09695940120033261.
- Black, P., & Harrison, C. (2001). Feedback in questioning and marking: The science teacher's role in formative assessment. *School Science Review*, 82(301), 55-61.
- Black, P., Harrison, C., Lee C., Marshall B., Wiliam D. (2003). *Assessment for Learning: Putting it Into Practice*. New York, NY: Open University Press.
- Black, P., & Wiliam, D. (1998). Assessment and classroom learning. *Assessment in Education: Principles, Policy & Practice*, 5(1), 7-74.
- Black, P., & Wiliam, D. (2004). Working inside the black box: Assessment for learning in the classroom. *Phi Delta Kappan*, 86(1), 8-21.
- Black, P., & Wiliam, D. (2009). Developing the theory of formative assessment. *Educational Assessment, Evaluation & Accountability*, 21(1), 5-31. doi:10.1007/s11092-008-9068-5

- Bloom, B. S. (1956). *Taxonomy of Educational Objectives: The Classification of Educational Goals*. New York: David McKay, 1956-1964.
- Brookhart, S. (2008). Feedback that fits. *Educational Leadership*, 65(4), 54-59.
- Brookhart, S., Moss, C., & Long, B., (2008). Formative assessment that empowers. *Educational Leadership*, 66(3), 52-57.
- Brophy, J., Good, T. L., & Michigan State University East Lansing Institute for Research on Teaching. (1984). *Teacher behavior and student achievement. occasional paper no. 73*.
- Butler, R. (1988). Enhancing and undermining intrinsic motivation: The effects of task-involving and ego-involving evaluation of interest and performance. *Educational Psychology*, 58, p. 1-14.
- Cauley, K. M., & McMillan, J. H. (2010). Formative assessment techniques to support student motivation and achievement. *Clearing House: A Journal of Educational Strategies, Issues and Ideas*, 83(1), 1-6.
- Chappuis, S. (2009). The quest for quality. *Educational Leadership*, 67(3), 14-19.
- Chin, C. (2006). Classroom interaction in science: Teacher questioning and feedback to students' responses. *International Journal of Science Education*. 28(11), 1315-1346.
- Davies, W. M. (2009). Groupwork as a form of assessment: Common problems and recommended solutions. *Higher Education: The International Journal of Higher Education and Educational Planning*. 58(4), 563-584.
- Department of Education (2008). *A Nation Accountable: Twenty-Five Years after "A Nation at Risk"*. U. S. Department Of Education.

- Erdogan, I., & Campbell, T. (2008). Teacher questioning and interaction patterns in classrooms facilitated with differing levels of constructivist teaching practices. *International Journal of Science Education*, 30(14), 1891-1914. doi:10.1080/09500690701587028.
- Guskey, T. R. (2007). Closing achievement gaps: Revisiting Benjamin S. Bloom's "learning for mastery". *Journal of Advanced Academics*, 19(1), 8-31.
- Hannel, I. (2009). Insufficient questioning. *Phi Delta Kappan*, 91(3), 65-69.
- Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of Educational Research*, 77(1), 81-112.
- Heritage, M. (2007). Formative assessment: What do teachers need to know and do?. *Phi Delta Kappan*, 89(2), 140-145.
- Heritage, M. (2010). *Formative Assessment: Making it happen in the classroom*. Thousand Oaks, CA: Corwin.
- Korkmaz, I. (2009). The examination of elementary teachers' effectiveness on using questioning strategies in their classrooms. *International Journal of Learning*, 16(6), 513-522.
- Lave, J. & Wenger E. (1991). *Situated Learning: Legitimate Peripheral Participation*. New York: Cambridge University Press.
- Leahy, S., Lyon, C., Thompson, M., & Wiliam, D. (2005). Classroom assessment minute by minute, day by day. *Educational Leadership*, 63(3), 18-24.
- Levin, T., & Long, R. (1981). *Effective Instruction*. Washington, DC: Association for Supervision and Curriculum Development.
- McMillan, J. H. (2010). *The Practical Implications of Educational Aims and Contexts for Formative Assessment*. In G. L. Cizek and H. L. Andrade (Eds.), *Handbook of formative assessment* (p. 41-59). New York: Routledge.

- Miller, D., & Lavin, F. (2007). 'But now I feel I want to give it a try': formative assessment, self-esteem and a sense of competence. *Curriculum Journal*, 18(1), 3-25.
doi:10.1080/09585170701292109.
- National Center for Education Statistics. (1998). Videotape Classroom Study: *Third International Math and Science Study*. Washington, D.C.: National Center for Education Statistics, U.S. Dept. of Education, Office of Educational Research and Improvement.
- Phillips, G. W., & American Institutes for Research. (2007). Expressing International Educational Achievement in Terms of U.S. Performance Standards: Linking NAEP Achievement Levels to TIMSS. *American Institutes for Research*.
- Popham, W. J. (2005). Student's attitude count. *Educational Leadership*, 62(5), 84-85.
- Popham, W. J. (2008). *Transformative Assessment*. Alexandria VA: Association for Supervision and Curriculum Development.
- Redfield, D. L., & Rousseau, E. W. (1981). A meta-analysis of experimental research on teacher questioning behavior. *Review of Educational Research*, 51(2), 237-245.
- Rowe, M. B. (1974). Wait-time and rewards as instructional variables, their influence on language, logic, and fate control: Part one-wait-time. *Journal of Research in Science Teaching*, 11(2), 81-94.
- Rowe, M. B. (1986). Wait times: Slowing down may be a way of speeding up. *Journal of Teacher Education*, 37(1), 43-50.
- Sadler, D. R. (1989). Formative assessment and the design of instructional systems. *Instructional Science*, 18(2), 119-144.

- Schunk, D. H. (2009). Social Cognitive Theory and Self-Regulated Learning. In Zimmerman, B.J. & Schunk, D. H. (Eds.), *Self-regulated learning and academic achievement: Theoretical perspectives* (125-152). New York, NY: Routledge.
- Shepard, L. A. (2000). The role of assessment in a learning culture. *Educational Researcher*, 29(7), 4-14.
- Shepard, L. A. (2005). Linking formative assessment to scaffolding. *Educational Leadership*, 63(3), 66-70.
- Shiman, D. A., & Nash, R. J. (1974). Questioning: Another view. *Peabody Journal of Education* (0161956X), 51(4), 246-253.
- Shute, V. (2008). Focus on formative feedback. *Review of Educational Research*. 78(1), 153-189.
- Slavin, R. E. (1996). Cooperative learning in middle and secondary schools. *Clearing House*, 69(4), 200-204.
- Stiggins, R. (2006). Assessment for learning: A key to motivation and achievement. *Edge: The Latest Information for the Education Practitioner*, 2(2), 1-19.
- Stiggins, R. (2010). *Essential Formative Assessment Competencies for Teachers and School Leaders*. In G. L. Cizek and H. L. Andrade (Eds.), *Handbook of formative assessment* (p. 233-250). New York: Routledge.
- Taba, H., & San Francisco State Coll., C. A. (1966). *Teaching Strategies and Cognitive Functioning in Elementary School Children*.
- Tienken, C. H., Goldberg, S., & DiRocco, D. (2009). Questioning the questions. *Kappa Delta Pi Record*, 46(1), 39-43.
- Vygotsky, L. S. (1962). *Thought and Language*. Oxford England: Wiley.

- Wilén, W. W., & Clegg Jr., A. A. (1986). Effective questions and questioning: A research review. *Theory & Research in Social Education, 14*(2), 153-161.
- William, D. (2010). *An Integrative Summary of the Research Literature and Implications for a New Theory of Formative Assessment*. In G. L. Cizek and H. L. Andrade (Eds.), *Handbook of formative assessment* (p. 18-40). New York: Routledge.
- William, D., Lee, C., Harrison, C., & Black, P. (2004). Teachers developing assessment for learning: Impact on student achievement. *Assessment in Education Principles Policy and Practice, 11*(1), 49-65.
- Zimmerman, B.J. & Schunk, D. H. (Eds.). (2009). *Self-regulated learning and academic achievement: Theoretical perspectives*. New York, NY: Routledge.