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Formative Assessment and Its Uses for Improving Student Achievement

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Raising the standards of learning achieved through formal schooling is a critical local, state and national priority. Governments at all levels have become more vigorous in their pursuit of the goal of improving learning in the schools. This is evident through changes made to curriculum standards at the national, state and local levels, through newly-adopted state testing requirements, and through national and international testing programs like NAEP (National Assessment of Educational Progress) and TIMSS (Third International Mathematics and Science Study).

The federal government has also actively entered into the movement to raise the standards of student learning through its legislation, The Elementary and Secondary Education Act, 2001 (No Child Left Behind Act). The stated purpose of the legislation is to:

ensure that all children have a fair, equal, and significant opportunity to obtain a high-quality education and reach, at a minimum, proficiency on challenging State academic achievement standards and State academic assessments.

The legislation goes on to indicate that this may be achieved by, among other methods,

(1) ensuring that high-quality academic assessments, accountability systems . . . curriculum, and instructional materials are aligned with challenging State academic standards so that students, teachers, parents, and administrators can measure progress against common expectations for student academic achievement

Essentially, this legislation requires states to monitor educational progress in their schools. Mandated assessment processes serve a variety of purposes: to provide evidence about trends over time within the country (e.g., NAEP), to compare standards of achievement with those in other countries (e.g., TIMSS), and to provide information with which teachers, educational administrators and politicians can be held accountable. Within schools and districts, mandated assessments that are aligned with mandated curriculum standards can inform teachers and administrators about ways to improve curriculum and classroom teaching to meet the standards.

Raising the *standards* for student learning is not a difficult thing; improving student *learning*, (particularly on a district-wide scale) is much more complex. Clearly, end-of-year assessments that are aligned with state and national learning standards have taken on greater significance now than ever before. Ultimately, the success of this educational reform effort relies on the alignment of three aspects of the teaching and learning process: curriculum, instruction, and assessment. These, in turn, are dependent on the leadership that administrators present to the educational community. Such leadership includes, according to Marzano (PPT, revised January, 2005), providing an environment which delivers a guaranteed and viable curriculum accompanied by challenging learning goals and effective feedback regarding the attainment of those goals.

End-of-year assessments are not designed to provide decision-makers with specific feedback to improve student learning in individual classrooms. However, teachers do use assessments throughout the school year. Such assessments are often referred to as "benchmark assessments," "classroom assessments," or "formative assessments." They take many forms, but they are at the heart of classroom culture (Marzano). They can be used to make decisions about curriculum, assessment, instruction and students; these assessments allow teachers to re-teach a lesson or concept and to be sure that their students have mastered what they need to know before they tackle end-of-year, statewide assessments. If the information is made available to district-level decision-makers, it can be used to make decisions about resource allocation and goal-setting.

The purpose of this paper is to describe and discuss these assessments, whatever their label. For this paper, the term “formative assessment” will be used and the following points will be addressed: what it is and how it is used; what the research indicates about it; and how and by whom it is used most effectively.

Defining Formative Assessment

Perhaps the most widely quoted definition of formative assessment comes from Black and Wiliam (1998) who state that formative assessment

... refers to all those activities undertaken by teachers, and by the students in assessing themselves, which provide information to be used as feedback to modify the teaching and learning activities in which they are engaged. Such assessment becomes formative when the evidence is actually used to adapt the teaching to meet needs. (p.2)

According to the research literature, some of the key elements of formative assessment include:

- identification by teachers and students of learning goals, intentions or outcomes and criteria for achievement,
- conversations (with feedback) between teachers and students that build on what is known and what is to be learned,
- active involvement of students in their own learning, and
- teachers responding to identified learning needs and strengths by modifying and/or adapting teaching strategies, materials and approaches (Black & Wiliam, 1998; Boston, 2002; Fontana & Fernandes, 1994; Fredrickson & White, 1997; Guskey, 2003; Liang & Creasy, 2004; Shepard, 2000; Stiggins & Conklin, 1992; Stiggins, 1992).

All decision-makers in a district need to know about their students’ progress and difficulties. The quality of instruction is dependent on this kind of information. But what does such assessment actually look like? And how is it used?

According to Richard Stiggins (1992), “Research suggests that teachers spend as much as one-third to one-half of their valuable professional time involved in assessment-related activities.” (p.211). These assessment activities include both informal and formal processes. *Informal* formative assessment can take place during any teacher-student interaction and has the potential of involving one student, a small group or the entire class. These opportunities are not always planned for specifically, yet they are “embedded and strongly linked to learning and teaching activities,” (Bell & Cowie, 2001, p.86). Although they may not formally plan, teachers can prepare by making varied opportunities available for carrying out informal formative assessments. For example, the use of verbal interactions, questioning between teacher and students, or teachers watching and listening to students as they work through a question, problem or discussion are types of informal formative assessments that occur daily in every classroom. These assessments allow teachers to make decisions about adaptations or modifications in their instruction to promote student learning.

Formal formative assessments – planned activities designed to provide evidence about student learning (Ruiz-Primo & Furtak, 2004) – are also used to guide improvement in student learning. The purpose of these assessments is to inform the teacher of the progress of the class, to help the teacher check students’ understanding of key elements of the curriculum being taught. If this information is made available to district-level administrators, it can be used to improve student achievement in a coherent way at a level beyond the single classroom.

Black & Wiliam (1998) suggest that for assessment to function formatively, the results have to be used to adjust teaching and learning. Whether it is classified as informal or formal formative assessment, such assessments are essential for teachers. This is how teachers learn whether their teaching has been effective, what needs to be taught again, and when the class is ready to move on. Formative assessments help teachers teach and students learn. (Guskey, 2003). It helps administrators make more informed decisions about all students’ learning.

What Research Says

Shepard (2000) writes that:

“Often assessment reform is promoted without distinguishing among several different assessment purposes, yet it is well known that validity depends on how a test is used. Should a statewide literacy test administered to third-graders every April for purposes of school accountability and grade-to-grade promotion also be used instructionally? . . . While it is true that something can be learned from every assessment about one’s own teaching as well as students’ strengths and weaknesses, . . . the uniform nature of external assessments and their infrequency means that they will rarely ask the right question at the right time to be part of the ongoing learning process.” (p.32)

For thirty or more years, researchers have investigated the effect of assessment generally on student learning. As they have examined the kinds of assessment, they have distinguished between summative/external (monitoring of achievement trends, school accountability, school funding, student proficiency levels) and formative/internal (used for the purposes of improving instruction and learning) assessment processes. Each has its place in education.

Shepard (2000) links formative or classroom assessment with the constructivist movement, which suggests that learning is an active process, building on previous knowledge, experience, skills, and interests. Since learning is highly individualized, constructivism recognizes that teaching must be adaptive to the context, involving complex decision-making, and requiring that a teacher draw upon a repertoire of techniques (Giebelhaus & Bowman, 2002).

It is taken for granted by constructivist theory that providing information or feedback to students in an ongoing manner – such as that which formative assessment should provide – will produce positive results. Black and Wiliam (1998) conducted an extensive review of research findings on the effectiveness of formative assessments on student learning. They examined only studies which looked at assessment feedback used to modify the teaching and learning activities. They conclude that:

- there is significant evidence that improving formative assessment improves student learning,
- there is evidence that knowledge about formative assessment processes needs improvement, and
- there is evidence about how to improve formative assessment.

Black and Wiliam (1998) report that learning gains were achieved in studies where the age groups ranged from 5-year-olds to university undergraduates, across several subjects, counties and ability levels. They concluded that efforts to strengthen formative assessments produce significant learning gains and that formative assessment helps low achievers even more than other students, thereby reducing the overall achievement gap.

As an important aspect of formative assessment, feedback contributes to gains in student learning. The most helpful feedback, producing the greatest gains, is that which helps students become aware of gaps that exist between the learning goal and current knowledge, understanding or skill through specific, carefully-focused feedback (Bangert-Drowns, Kulick & Morgan, 1991; Ramaprasad, 1983; Sadler, 1989). Studies indicate that students who understand the learning goals and the assessment criteria, and have opportunities to discuss and/or reflect on their work, show greater progress than those who do not (Fontana & Fernandes, 1994; Frederickson & White, 1997).

However, studies indicate that there are a number of factors that may mitigate the positive effects of formative assessment. First, knowledge about formative assessment processes is not well developed during teacher preparation programs (Stiggins, 1992) and current classroom assessment practices emphasize superficial and rote learning, concentrating on recall and details (Black, 1993; Crooks, 1988). Further, according to both Black and Crooks, there is a tendency for teachers to use normative rather than criterion-based assessments which emphasize ranking students in a class rather than evaluating personal improvement. Often this produces negative impacts on lower-achieving students and reinforces the notion that they cannot learn or achieve the goal. District-level administrators have an important role to play in helping teachers use the results of formative assessment in improving student achievement.

Suggestions to teachers for improving the use of formative assessments are noted in most of the research reviewed. For example, research indicates that to see learning gains through the use of formative assessments, learning tasks should promote the use of feedback by providing unique and varied opportunities for learning, offer reasonable challenges, and help students develop specific, short term, relevant learning goals. Teachers need to begin to frame questions which promote critical reasoning and analysis. According to Black and Wiliam (1998) studies have found that requiring students to develop questions on a topic, with explanations that explore their prior knowledge, does improve student learning, most likely because it provides a link between the new and old information. In brief, they make the following suggestions:

- Although testing should not be the only form of classroom assessment, when you do use testing, more frequent shorter tests are preferable to less frequent longer tests.
- New learning should be assessed within about a week of first exposure.
- Work with other teachers and outside sources to collect good test items.
- Use the test results to inform how learning should proceed.

Numerous resources are available to teachers that provide examples of sound formative assessment projects and ideas in a variety of subject fields. One, Robert Marzano and colleagues' *Classroom Instruction That Works: Research-Based Strategies for Increasing Student Achievement* (2001), describes many kinds of activities which are found to produce learning gains based on research. These activities assist teachers as they make informed decisions about instruction. Teachers that incorporate such practices into their classroom instruction can expect to see the dividends of their efforts in improvements in student achievement

Uses of Formative Assessment

Teachers and their classes generally are required to participate in some form of summative assessment for the purpose of grading or for other accountability requirements. However, formative assessment allows teachers to monitor and then guide students' learning over time in varied situations. Such assessment has been shown in the literature to contribute to learning gains. As such, it is important to consider the best uses of formative assessment.

Anyone who has an interest in student learning can use the results of formative assessment. The most direct users of formative assessment are probably teachers, students, and parents (Stiggins, 1992), but clearly administrators are also interested in the periodic progress of students towards the district and state curriculum goals. Teachers use formative assessments to make decisions about what needs to be taught and to whom. When such data is readily available, teachers can use it as a diagnostic tool or to determine if remediation or enrichment might be beneficial. Decisions about the kind of instruction – the instructional methodology – will also be guided by good formative assessments. Formative assessments help teachers see what works and what doesn't in terms of student learning. As a teaching tool, formative assessments help teachers provide focused feedback, inform students of teachers' expectations, and provide students with information that will allow them to make decisions about their own learning.

In addition to empowering students who wish to be more engaged in their own learning, formative assessments and the data these provide assist parents (Stiggins, 1992). They help parents set expectations, plan educational resources, establish home learning environments and assist with instruction based on their understandings of the achievement of their children. How parents relate to the schooling experience is in large part impacted by their interpretations of classroom formative assessments.

Importantly, school and district administrators use the feedback that teachers can provide regarding their students' progress as measured by formative assessment for such activities as planning professional development activities, working with parents and parent groups, developing school-wide goals and incentive programs, and planning extended enrichment or remediation programs. In addition, school and district administrators rely on such data to develop state and federal reports to secure various funding opportunities. If the data is readily accessible, it is clear that formative assessments can play a critical role in the educational environment and decision making for all stakeholders.

Conclusions

The research evidence clearly indicates that good, well-developed, formative assessment does have a powerful impact on student learning. Further, formative assessment has been found to help low achievers even more than other students, reducing the overall achievement gap. Teachers, however, often need additional support for discovering and/or developing formative assessment tools which not only inform students and teachers about progress, but provide assistance on where the gaps are and how to proceed. An assessment system which provides for periodic standards-based formative assessments plays a vital part in promoting student learning.

<i>Assessment</i>	Formative Assessment Research
Inclusion of thousands of items for easy creation of tests that measure student learning.	Formal formative assessments (also known as “benchmark assessments”) are planned activities that provide evidence about student learning. They are essential in analyzing student learning.
Assessment data reports show performance of students in terms of standards, so teachers can focus on areas where students need help.	Formative assessments inform teachers (and students and their parents) of progress towards learning goals.
Customization of benchmark assessments allows for selecting items from a test bank, as well as adding teacher-developed items.	Formative assessments include such activities as quizzes and tests that are developed to address specific standards and criteria. Teachers express a preference for creating or customizing the assessments they use.
The assessment data is given in real time.	Teachers need to examine and analyze the results of formative assessments to make daily instructional decisions.
Key stakeholders have access to assessment data via easy to read reports.	<ul style="list-style-type: none"> * Teachers need feedback to plan instruction. * Students need feedback to assess their own performance. * Parents need feedback based on reliable data to make decisions regarding their children’s educational experiences.
Assessments are aligned with curriculum standards.	<ul style="list-style-type: none"> * Administrators must monitor progress of schools towards meeting district goals, which include meeting state standards. * Teachers must monitor progress of their classes towards meeting district goals, which include meeting state standards.

Glossary of Terms

benchmark assessments usually classroom assessment given at specific points in the instruction to determine if short term goals have been met. Often, but not always, such assessments take the form of objective quizzes and tests and are used to determine how instruction should proceed.

classroom assessments activities developed by primarily teachers (but can include learners) to measure learning progress towards a goal. These activities frequently are used to inform teachers about how instruction should proceed.

constructivism suggests that the learner is actively involved in a joint enterprise with the teacher in the learning process. "Cognitive constructivism" is used to describe how the individual learner understands things, and "social constructivism" emphasizes how meanings and understandings grow out of social or group encounters.

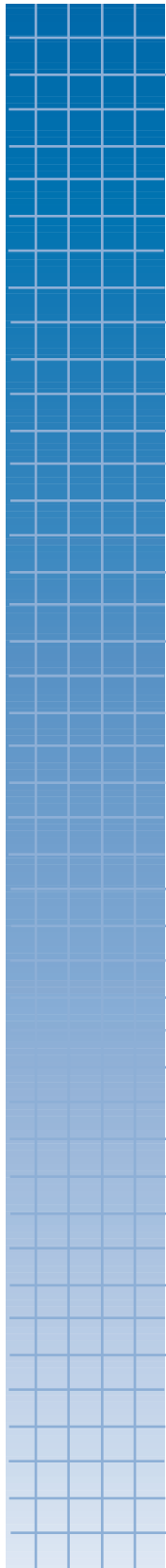
feedback information resulting from a classroom assessment or activity. Such information can be used to inform instruction.

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