

Marked with Measuring: Linking your Assessment Tool to your Student Learning Outcomes

According to Kellough and Kellough, "Teaching and learning are reciprocal processes that depend on and affect one another. Thus, the assessment component deals with how well the students are learning and how well the teacher is teaching" (1999, p. 417). It is the "assessment component" of teaching and learning that this workshop will address.

The Purpose of Assessment

Before addressing the different *types* of assessment, it is instructive to delineate assessment's *purposes*. Kellough et al (p. 418-419) characterizes seven purposes of assessment:

- To assist student learning.
- To identify students' strengths and weaknesses.
- To assess the effectiveness of a particular instructional strategy.
- To assess and improve the effectiveness of curriculum programs.
- To assess and improve teaching effectiveness.
- To provide data that assist in decision making
- To communicate with and involve parents.

Because the welfare and, indeed, the future of so many people depend on the outcomes of assessment, it is impossible to overemphasize its importance. For a learning endeavor to be successful, the learner must have answers to basic questions: Where am I going? Where am I now? How do I get where I am going? How will I know when I get there? Am I on the right track for getting there? These questions are integral to a good program of assessment (pg. 419).

In view of such questions, it is requisite to establish principles that will guide assessment's implementation. Towards such an end, the American Association for Higher Education (AAHE) has established the following principles:

- **The assessment of student learning begins with educational values.** Assessment is not an end in itself but a vehicle for educational improvement. Its effective practice, then, begins with and enacts a vision of the kinds of learning we most value for students and strive to help them achieve. Educational values should drive not only *what* we choose to assess but also *how* we do so. Where questions about educational mission and values are skipped over, assessment threatens to be an exercise in measuring what's easy, rather than a process of improving what we really care about.
- **Assessment is most effective when it reflects an understanding of learning as multidimensional, integrated, and revealed in performance over time.** Learning is a complex process. It entails not only what students know but what they can do with what they know; it involves not only knowledge and abilities but values, attitudes, and habits of mind that affect both academic success and performance beyond the classroom. Assessment should reflect these understandings by employing a diverse array of methods, including those that call for actual performance, using them over time so as to reveal change, growth, and increasing degrees of integration. Such an approach aims for a more complete and accurate picture of learning, and therefore firmer bases for improving our students' educational experience.
- **Assessment works best when the programs it seeks to improve have clear, explicitly stated purposes.** Assessment is a goal-oriented process. It entails comparing educational performance with educational purposes and expectations -- those derived from the institution's

mission, from faculty intentions in program and course design, and from knowledge of students' own goals. Where program purposes lack specificity or agreement, assessment as a process pushes a campus toward clarity about where to aim and what standards to apply; assessment also prompts attention to where and how program goals will be taught and learned. Clear, shared, implementable goals are the cornerstone for assessment that is focused and useful.

- **Assessment requires attention to outcomes but also and equally to the experiences that lead to those outcomes.** Information about outcomes is of high importance; where students "end up" matters greatly. But to improve outcomes, we need to know about student experience along the way -- about the curricula, teaching, and kind of student effort that lead to particular outcomes. Assessment can help us understand which students learn best under what conditions; with such knowledge comes the capacity to improve the whole of their learning.
- **Assessment works best when it is ongoing not episodic.** Assessment is a process whose power is cumulative. Though isolated, "one-shot" assessment can be better than none, improvement is best fostered when assessment entails a linked series of activities undertaken over time. This may mean tracking the process of individual students, or of cohorts of students; it may mean collecting the same examples of student performance or using the same instrument semester after semester. The point is to monitor progress toward intended goals in a spirit of continuous improvement. Along the way, the assessment process itself should be evaluated and refined in light of emerging insights.
- **Assessment fosters wider improvement when representatives from across the educational community are involved.** Student learning is a campus-wide responsibility, and assessment is a way of enacting that responsibility. Thus, while assessment efforts may start small, the aim over time is to involve people from across the educational community. Faculty play an especially important role, but assessment's questions can't be fully addressed without participation by student-affairs educators, librarians, administrators, and students. Assessment may also involve individuals from beyond the campus (alumni/ae, trustees, employers) whose experience can enrich the sense of appropriate aims and standards for learning. Thus understood, assessment is not a task for small groups of experts but a collaborative activity; its aim is wider, better-informed attention to student learning by all parties with a stake in its improvement.
- **Assessment makes a difference when it begins with issues of use and illuminates questions that people really care about.** Assessment recognizes the value of information in the process of improvement. But to be useful, information must be connected to issues or questions that people really care about. This implies assessment approaches that produce evidence that relevant parties will find credible, suggestive, and applicable to decisions that need to be made. It means thinking in advance about how the information will be used, and by whom. The point of assessment is not to gather data and return "results"; it is a process that starts with the questions of decision-makers, that involves them in the gathering and interpreting of data, and that informs and helps guide continuous improvement.
- **Assessment is most likely to lead to improvement when it is part of a larger set of conditions that promote change.** Assessment alone changes little. Its greatest contribution comes on campuses where the quality of teaching and learning is visibly valued and worked at. On such campuses, the push to improve educational performance is a visible and primary goal of leadership; improving the quality of undergraduate education is central to the institution's planning, budgeting, and personnel decisions. On such campuses, information about learning outcomes is seen as an integral part of decision making, and avidly sought.

- **Through assessment, educators meet responsibilities to students and to the public.** There is a compelling public stake in education. As educators, we have a responsibility to the publics that support or depend on us to provide information about the ways in which our students meet goals and expectations. But that responsibility goes beyond the reporting of such information; our deeper obligation -- to ourselves, our students, and society -- is to improve. Those to whom educators are accountable have a corresponding obligation to support such attempts at improvement.

Types of Assessment

There are numerous assessment tools available to measure outcomes and many more that can be created based on the needs of the course, faculty member, and students. This section will give you some ideas on how to make sure that your assessment tool is really measuring the Student Learning Objective that you have written. Remember, some things are more easily measured than others so you need to be sure that your Student Learning Outcomes reflect something that can be effectively measured and communicated with others.

The purpose of assessment is to support data-driven decision-making and measure knowledge, skills, or abilities against defined competencies or learning outcomes. Assessments associated with the learning process are often classified as diagnostic, formative, needs, reactive, or summative. The definitions of these assessments are listed below:

- **Diagnostic assessments** are primarily used to identify needs and to determine prior knowledge of individual participants. Diagnostic assessments usually occur prior to a learning experience. These are often known as "placement tests" or "placement exams".

For example, the Heritage College Mathematics Department administers a diagnostic test to all Math 98, 99, and 101 students during the first week of each new semester. Math 98 students take an exam that covers Math 97 material; Math 99 students take one that covers Math 97 and 98 materials; and Math 101 students take one that covers Math 97, 98, and 99 materials. Based on the diagnostic exam results, each student's deficiencies are determined, and each student is subsequently required to complete a computer-based mathematics tutorial program that is tailored to his or her specific difficulties. Because the primary purpose of the diagnostic test is remediation, it is both un-graded and low-stakes.

- **Formative assessment** has the primary objective of providing prescriptive feedback to a student to inform next steps in the instructional process. Educators tend to use quizzes in this fashion.

Formative assessment should occur regularly throughout the instructional process and, According to the National Center for Fair and Open Testing (NCFOT) (1999), it "occurs when teachers feed information back to the students in ways that enable the student to learn better, or when students can engage in a similar, self-reflective process". In its purist form, formative tests are not graded and are used as an ongoing diagnostic tool; hence, the instructor employs the results of formative assessment solely to modify and adjust his or her teaching practices to reflect the needs and progress of his or her students.

- **Needs assessment** is used to determine the knowledge, skills, abilities and attitudes of a group to assist with gap analysis and courseware development. Gap analysis determines the variance between what a student knows and what they are required to know. This too is a diagnostic tool, but it is used in the context of performance improvement in a workplace.

- **Reaction assessment** takes place after a course or learning experience to gather the students' opinions. Reaction assessments are often known as "smile sheets", "level I surveys" or "course evaluations".
- **Summative assessment** is where the primary purpose is to give a quantitative grading and make a judgment about the participant's achievement. Summative assessments typically take place at the end of a course of instruction where the goal is to provide overall information on the amount and quality of student learning. These are often known as "mid-term exams" or "final exams".

There are a number of types of assessment, each of which is appropriate for different assessment purposes or goals. When deciding the type of assessment to use, first consider the purpose of the assessment. Is it for diagnostic or placement purposes? Is it to provide feedback throughout the learning process? Is it to determine at the end of a course of student if a student has mastered skills defined in a set of standards? Is it to determine student opinions? Depending on the purpose of the assessment, different types of assessments may be utilized. The following table lists the types of assessment, their definitions, and their related purposes.

Type of Assessment	Definition	Purpose	Examples
Performance	A stimulus or prompt designed to elicit a performance from a student to demonstrate knowledge, skills, and abilities related to a specific problem-solving activity in a specific context.	Needs Diagnostic Formative Summative	1. Use appropriate tools in an automotive skills class to fix a mechanical problem with an engine. 2. Class assignment 3. Tutorial 4. Interviews 5. Peer reviews
Portfolio	Systematic collections of work products that are typically collected over time. May contain assessment scores, work artifacts, student journals or notes.	Formative Summative	1. Course portfolio 2. College portfolio 3. Student portfolio 4. Journals
Production	A stimulus or prompt designed to have a student produce a work artifact to demonstrate knowledge, skills, and abilities related to a specific problem-solving activity in a specific context.	Needs Diagnostic Formative Summative	1. Produce an Excel spreadsheet in an accounting class to demonstrate mastery of accounting practices. 2. Class assignment 3. Tutorial 4. Essay test 5. Speaking test
Survey	A set of questions designed to elicit student opinions about the learning environment	Reaction Needs	1. Course or instructor evaluation 2. Survey of student services 3. Survey of student satisfaction 4. Focus groups
Quiz	A set of questions used to measure a student's knowledge or skills for the purpose of providing feedback to inform the student and the teacher of	Formative	1. Informal, in-course set of questions to determine if students are tracking with the content or if misconceptions

	the current level of knowledge or skill.		are developing. Useful for determining next events in learning process. 2. Class assignment 3. Tutorial 4. Case study
Test	A method for determining student learning at defined intervals before, within, or after a course of study to determine if students are ready for the next stage of instruction.	Needs Diagnostic Summative	1. Placement test or pretest before a course starts 2. Mid-term 3. Final test in a course 4. Case study
Exam	A method for determining whether student learning meets criteria established by an external source.	Summative	1. Certification exam where a cut-score must be achieved before the student may be certified or licensed in a field. Job placement exam, where a cut-score must be obtained before a job will be offered.

It is important that your chosen assessment tool, whether one listed in the chart above, or one that you construct for your own use, have a clear link to the Student Learning Outcomes. This will be beneficial for both you and your students in linking the knowledge and skills they are supposed to learn with the concrete methods of assessment. One way to do that is by answering four central questions:

1. What will the student be able to do "out there"? [Student Learning Outcomes](#)
2. How will the outcomes be demonstrated "in here"? [Assessment Tasks](#)
3. What skills will be learned in this course? [Skills](#)
4. What concepts and issues need to be understood? [Concepts and Issues](#)

The Concept of Formative Assessment

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While many educators are highly focused on state tests, it is important to consider that over the course of a year, teachers can build in many opportunities to assess how students are learning and then use this information to make beneficial changes in instruction. This diagnostic use of assessment to provide feedback to teachers and students over the course of instruction is called formative assessment. It stands in contrast to summative assessment, which generally takes place after a period of instruction and requires making a judgment about the learning that has occurred (e.g., by grading or scoring a test or paper). This article addresses the benefits of formative assessment and provides examples and resources to support its implementation.

Purpose and Benefits of Formative Assessment

Black and William (1998b) define assessment broadly to include all activities that teachers and students undertake to get information that can be used diagnostically to alter teaching and learning. Under this definition, assessment encompasses teacher observation, classroom discussion, and analysis of student work, including homework and tests. **Assessments become formative when the information is used to adapt teaching and learning to meet student needs.**

When teachers know how students are progressing and where they are having trouble, they can use this information to make necessary instructional adjustments, such as reteaching, trying alternative instructional approaches, or offering more opportunities for practice. These activities can lead to improved student success.

Black and William (1998a) conducted an extensive research review of 250 journal articles and book chapters winnowed from a much larger pool to determine whether formative assessment raises academic standards in the classroom. They concluded that efforts to strengthen formative assessment produce significant learning gains as measured by comparing the average improvements in the test scores of the students involved in the innovation with the range of scores found for typical groups of students on the same tests. Effect sizes ranged between .4 and .7, with formative assessment apparently helping low-achieving students, including students with learning disabilities, even more than it helped other students (Black and William, 1998b).

Feedback given as part of formative assessment helps learners become aware of any gaps that exist between their desired goal and their current knowledge, understanding, or skill and guides them through actions necessary to obtain the goal (Ramaprasad, 1983; Sadler, 1989). The most helpful type of feedback on tests and homework provides specific comments about errors and specific suggestions for improvement and encourages students to focus their attention thoughtfully on the task rather than on simply getting the right answer (Bangert-Drowns, Kulick, & Morgan, 1991; Elawar & Corno, 1985). This type of feedback may be particularly helpful to lower achieving students because it emphasizes that students can improve as a result of effort rather than be doomed to low achievement due to some presumed lack of innate ability. Formative assessment helps support the expectation that all children can learn to high levels and counteracts the cycle in which students attribute poor performance to lack of ability and therefore become discouraged and unwilling to invest in further learning (Ames, 1992; Vispoel & Austin, 1995).

While feedback generally originates from a teacher, learners can also play an important role in formative assessment through self-evaluation. Two experimental research studies have shown that students who

understand the learning objectives and assessment criteria and have opportunities to reflect on their work show greater improvement than those who do not (Fontana & Fernandes, 1994; Frederikson & White, 1997). Students with learning disabilities who are taught to use self-monitoring strategies related to their understanding of reading and writing tasks also show performance gains (McCurdy & Shapiro, 1992; Sawyer, Graham, & Harris, 1992).

Examples of Formative Assessment

Since the goal of formative assessment is to gain an understanding of what students know (and don't know) in order to make responsive changes in teaching and learning, techniques such as teacher observation and classroom discussion have an important place alongside analysis of tests and homework.

Black and William (1998b) encourage teachers to use questioning and classroom discussion as an opportunity to increase their students' knowledge and improve understanding. They caution, however, that teachers need to make sure to ask thoughtful, reflective questions rather than simple, factual ones and then give students adequate time to respond. In order to involve everyone, they suggest strategies such as the following:

- Invite students to discuss their thinking about a question or topic in pairs or small groups, then ask a representative to share the thinking with the larger group (sometimes called think-pair-share).
- Present several possible answers to a question, then ask students to vote on them.
- Ask all students to write down an answer, then read a selected few out loud.

Teachers might also assess students' understanding in the following ways:

- Have students write their understanding of vocabulary or concepts before and after instruction.
- Ask students to summarize the main ideas they've taken away from a lecture, discussion, or assigned reading.
- Have students complete a few problems or questions at the end of instruction and check answers.
- Interview students individually or in groups about their thinking as they solve problems.
- Assign brief, in-class writing assignments (e.g., "Why is this person or event representative of this time period in history?")

(The November/December 1997 issue of *Clearinghouse* magazine is devoted to practical ideas for formative assessment. See especially Mullin and Hill for ideas for history classes, McIntosh for mathematics, Childers and Lowry for science, and Bonwell for higher education.)

In addition to these classroom techniques, tests and homework can be used formatively if teachers analyze where students are in their learning and provide specific, focused feedback regarding performance and ways to improve it. Black and William (1998b) make the following recommendations:

- Frequent short tests are better than infrequent long ones.
- New learning should be tested within about a week of first exposure.
- Be mindful of the quality of test items and work with other teachers and outside sources to collect good ones.

Portfolios, or collections of student work, may also be used formatively if students and teachers annotate the entries and observe growth over time and practice (Duschl & Gitomer, 1997).

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