

# Tired of Teaching to the Test? Alternative Approaches to Assessing Student Learning

By Laurie Abbott

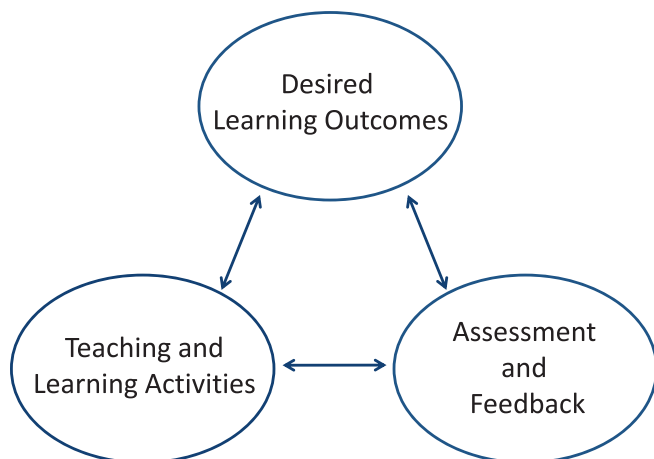
If you ask teachers what they feel is most rewarding about their work, nearly all will say it's the joy that comes when students "get it," and when students are motivated to learn, enjoy learning, and find it a rewarding experience. When asked about which tasks are most disagreeable, grading usually ranks quite highly. Similarly, students generally rate engaging learning activities highly and, with a few exceptions, don't relish taking exams. We typically use exams to assess student learning, and grades provide a means of recognizing specific levels of achievement or mastery. But can we effectively assess the diverse competencies and real-world skills that we want our students to develop with exams alone?

Range science education programs structure their curriculum by identifying desired learning outcomes—what do we want our students to be able to know, what skills and abilities will they need in order to succeed in the profession? Well-trained rangeland professionals are expected to have discipline-specific knowledge in the areas of rangeland ecology and management, basic sciences, and soil, plant, and animal sciences. In addition to knowledge and technical proficiency in core-content areas, rangeland professionals need well-developed oral and written communication skills, need to be able to work well in interdisciplinary teams (either as leaders or team members), need "people" skills to successfully interact with a diverse set of colleagues and stakeholders, and need a well-developed appreciation of professionalism and ethics. Indeed, program accreditation standards set by the Society for Range Management specify discipline-specific coursework and strongly recommend that programs provide ample mechanisms for students to develop competencies in the additional areas mentioned above.<sup>1</sup>

The fundamental point of education is to induce learning, and assessment is the process by which we can determine whether learning is occurring, if it has occurred, and to what level students have learned.<sup>2</sup> We use assessment to address these questions: have students learned what we want them to learn, and do they possess the knowledge, skills, and

abilities encompassed by the desired learning outcomes? A basic tenet of educational process is alignment between desired learning outcomes, learning activities, and assessment (Fig. 1).<sup>3</sup> If we want students to be able to do X, aligned activities give students opportunities to learn fundamental information about X if it is content or knowledge-based, or opportunities to practice doing X if it is a skill or ability, and aligned assessment addresses how well students can do X. Although alignment between learning outcomes, activities, and assessment might seem elementary, it can be elusive. Learning occurs at different levels, classically described as a hierarchy of educational objectives that separates fundamental from higher-order learning. A recent revision of "Bloom's Taxonomy" identifies six levels of the cognitive process in order of increasing complexity: remember, understand, apply, analyze, evaluate, and create.<sup>4</sup> Traditional assessment generally takes the form of exams (or quizzes) in which students select responses from a set of potential answers provided to them (e.g., multiple choice, true-false, fill-in-the blank) rather than create their own responses. In general, assessments that are centered on selection of a response tend to test at the lower-order levels of learning. It is possible (yet quite difficult) to create multiple-choice exams that test at higher levels of learning, and although a student might select the correct answer, there remains at least some probability that the correct answer was selected by chance, and doesn't truly reflect learning. Although short answer-essay questions can scratch at the surface of higher-order cognitive skills, it remains a challenge to assess deep learning, complex problem-solving, interpersonal skills, or to foster creativity using traditional exam formats.

By diversifying our approaches to assessment, we meet the needs of diverse students—our students might have diverse learning styles and diverse backgrounds, and by offering a broader range of assessment formats, we provide a variety of means for them to learn and to demonstrate the depth of their learning.<sup>2,5</sup> In addition, diversification of assessment formats gives students opportunities to develop



**Figure 1.** Model showing the alignment of fundamental components in integrated course design. The bidirectional arrows indicate that alignment between the circled components is dynamic: each component informs and is informed by the other components. Adapted from Fink (1998),<sup>3</sup> Copyright ©1998 John Wiley & Sons, Inc. Reproduced with permission of John Wiley & Sons, Inc.

and refine interpersonal skills that are key assets for range-land professionals. I am not arguing that we should do away with all exams. I give exams to my students, and as much as I dislike grading, I do that, too. I believe that in some cases teachers at all levels become overly dependent on using exams to assess student learning, partly because this is what we were brought up on, it is a format that is very familiar to us, and we simply might not be aware of or be comfortable using alternative approaches to assessing student learning. My main objective in this article is to describe some alternative approaches to traditional assessment, provide a few examples, and to suggest additional resources that teachers can use to facilitate incorporation of alternative assessment in their own “assessment toolbox.”

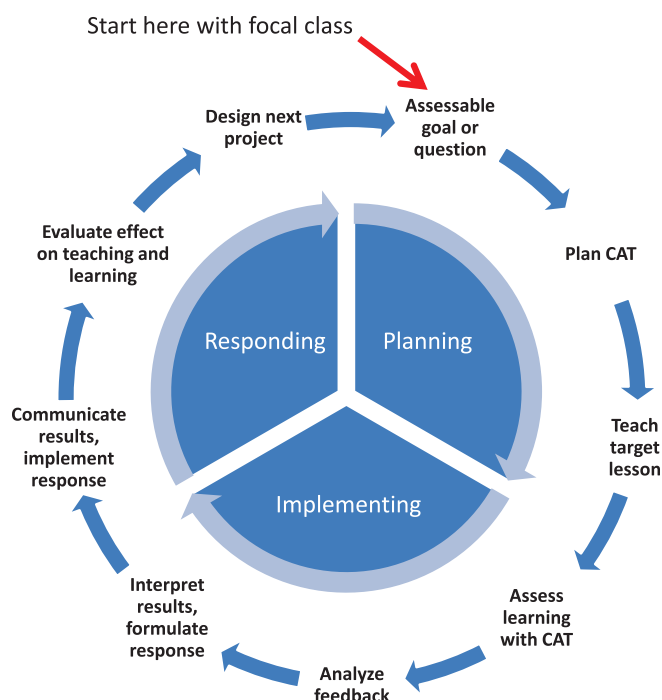
### How Do We Know If They Are “Getting It”?

Teaching and learning are processes that we generally assume are linked and, in an ideal world, we envision a positive, direct correlation between them: high-quality teaching results in high-quality learning. Unfortunately, the linkages between these two processes are not always ideal, which can result in unwelcome surprises at test-time—students and teachers alike *thought* the students were learning, but there was an apparent, undetected disconnect at some point in the process. To increase the efficiency of teaching and facilitate the learning process, it is highly desirable to assess learning *as it is occurring*—essentially, to put a finger on the pulse of learning. Being able to accurately determine how well students are grasping material or mastering concepts provides valuable feedback to teachers and students, enabling them to make timely adjustments in the teaching–learning process, and ultimately improve student learning.<sup>6</sup>

Classroom Assessment is a simple and adaptable approach that teachers can use to assess learning during the learning

process and determine how well students are meeting course-specific learning objectives. Angelo and Cross’s book *Classroom Assessment Techniques: A Handbook for College Teachers*<sup>6</sup> is an elegantly written step-by-step guide that details a way of monitoring learning in real time, an adaptive approach to learning. The book describes 50 different Classroom Assessment Techniques (CATs), each of which rapidly provides feedback to teachers about what, how much, and how well students are learning, and most importantly, helps teachers detect pitfalls and roadblocks to learning. The overall approach is very similar to adaptive management, an ongoing cycle that begins with planning (identify a specific learning goal and select an appropriate feedback device—the CAT), implementation (teach, administer the CAT, analyze and interpret student feedback from the CAT), and response (let the students know the results of the CAT and what adjustments the teacher and/or students can make to improve learning), which leads to planning the next Classroom Assessment cycle (Fig. 2).<sup>6</sup>

The 50 CATs span a range of applications, and teachers can select an appropriate CAT by identifying specific teaching goals ranging from higher-order thinking skills, basic academic success skills, discipline-specific knowledge and skills, and personal development, among others. Each CAT is fully described, including examples and suggested appli-



**Figure 2.** Classroom assessment cycle showing steps needed to carry out a single Classroom Assessment Technique (CAT). The cycle begins with the initial step of identifying a goal or question specific to a focal class (red arrow), and progresses through the planning, implementing, and responding phases. After completion of one cycle, proceeding to the next CAT ensures that assessment of student learning is continuous and ongoing. Adapted from Angelo and Cross (1993),<sup>6</sup> Copyright ©1998 John Wiley & Sons, Inc. Reproduced with permission of John Wiley & Sons, Inc.

cations, and includes information about estimated time and effort needed for preparation, implementation, and analysis. One of the simplest CATs to administer is the Minute Paper, in which students are given 2 to 3 minutes to summarize the most important thing they learned in today's class, and to pose any questions that remain unanswered. This CAT requires that students synthesize information and integrate ideas holistically, as well as giving students an opportunity to discretely (and usually anonymously) raise questions about concepts that are unclear. The Applications Cards technique involves asking students to write down at least one possible, real-world application for a principle, generalization, theory, or procedure that they just learned. Not only does this CAT provide immediate feedback to the teacher about how well students understood the concept and its applications, it gives the students a way to connect new concepts to prior knowledge and promotes creative thinking.<sup>6</sup> The formative use of assessments such as these provides a mechanism to help teachers close the gap between where students are currently performing relative to intended learning objectives.<sup>2,6</sup>

### How Do We Know If They “Got It”?

Although formative assessments are used to determine how well students are learning and to provide feedback during the learning process, summative assessment focuses on determining what has been learned, and commonly results in assignment of a grade. The following sections focus on two primary approaches to figuring out whether students have achieved learning objectives: traditional assessment and authentic assessment.

#### *Alternatives to Traditional Assessment: New Twists on an Old Theme*

Exams are often viewed as an endpoint by both students and teachers—finish the module, take the exam, get the grade, and move forward. Perhaps most troubling is the tendency for some students to hit the mental “delete” key following an exam or at the conclusion of the course. This tendency might reflect individual students' approach to learning, studying, and engaging with course content,<sup>7</sup> but can be reinforced by the approach to assessment. Certainly, traditional assessments generally test an individual's ability to recall or apply knowledge within specific time limits—do our exams entice students to engage with subject matter, or compel them to simply grapple with it? Here I describe three twists on the traditional assessment theme that can be employed to promote deeper learning through the examination process—each requires a certain “relaxation” of the traditional rules of testing.

*Take-home exams* are perhaps the most commonly used alternative type of traditional examination. Since students have an extended, yet well-defined, time period to complete the exam, and are typically permitted access to resources such as books and class notes, students can address questions that require detailed analysis, creative and thoughtful solutions to

complex problems, and can engender synthetic and critical thinking. The expanded time frame enables students to devote time to thinking, researching and developing solutions; reduces several sources of test-anxiety; and enables teachers to plumb the depths of student learning. Of course, take-home exams have inherent drawbacks, primarily related to ensuring that students do their own work without engaging resources that are not permitted by the instructor. In my experience, most students embrace being trusted to approach take-home exams with integrity and honesty. Furthermore, students quickly recognize that cheating is extremely difficult when complex questions require creative, detailed answers.

*Oral examination* is a centuries-old approach to assessment that has, for the large part, fallen by the wayside, perhaps a casualty of efficiency. An exceptional benefit of oral examination is their capacity to allow teachers to explore the depths of a student's understanding of a complex subject, and engage in scholarly conversation. One of my colleagues has offered an optional oral exam in lieu of a written final exam for several years and strongly attests to the benefits of this approach, despite the associated time costs; by far, the oral exam option is the preferred choice of the students in this course on ruminant nutrition. A dry-erase board enables the student to diagram and explain processes, and the teacher has flexibility and discretion to opportunistically direct the questioning based on real-time feedback during the exam. By guiding students as they negotiate answering a series of complex, related questions, the teacher can assess higher-order learning, and help students make impromptu connections in the learning context—the elusive “Aha!” moment.

Another twist to the theme of traditional assessment is the use of *group examinations*. Group exams are particularly appropriate in field or lab-oriented science courses that include cooperative, collaborative learning activities such as collection, analysis, and interpretation of data.<sup>8</sup> Whereas collaborative testing formats have been shown to improve long-term retention of knowledge in some contexts, and learning is often enhanced when students articulate concepts and respond to the reasoning of their peers, teachers need to address the perception that group exams favor under-prepared students.<sup>8,9</sup> Apprehension about issues of fairness and equity can often be addressed by offering a “small-stakes” assessment in which individuals take a quiz independently, and subsequently as a group, and then reflect on the outcome in terms of their own comprehension and the earned grade. Group exams can be given in various formats, and I briefly review four models here that are described in greater detail by Hodges:<sup>8</sup> 1) *stand-alone group assessments*—the only form of assessment within a specific module is by group examination, and this works well when learning activities were carried out by groups; 2) *hybrid exams that incorporate individual and group components*—after individual students take an exam independently, groups are given one or two additional questions to answer collaboratively. The group answers are scored separately and added

to the individual's score; 3) *group exam as a follow-up to an individual exam*—after individual students take an exam independently, the entire exam is retaken by small groups; and 4) *peer-coaching during individual exams*—after taking an exam individually, small student groups are allowed to discuss the exam, and each student subsequently retakes the same exam independently. The exam is scored by adding points from the first and second exam or by averaging the two scores. Providing bonus points that reflect the degree of improvement across the group gives students the incentive to teach each other and engage in cooperative learning.

For over a decade I have been giving group exams as a follow-up to individual exams (the one-two punch) in my rangeland inventory and monitoring course. After taking the exam individually, I create ad hoc groups of four students as they finish the exam, relocate them to a room where they can converse privately, we review the “rules of engagement,” and they take the exam a second time. As was the case for the individual exam, students do not have access to their notes, books, or internet during the group exam, and they must discuss each question and arrive at consensus before writing each answer. They equally share the role of “scribe” so that no one student is burdened with the task of rewriting the entire exam. A recent revision to the process is inclusion of a “life-line rule”: if the group cannot arrive at consensus, they call me into the room, explain the nature of the dilemma, and through a process of reasoning and guided question-and-answer, the issue is resolved. At first, students are often rather dubious about the prospect of engaging in this exam format until they realize that their overall exam grade is almost always improved by the group component of the score. When asked to reflect on this exam format at the end of the semester, most students respond that the group exam approach increased their learning, and encourage me to continue using this technique.

### *Authentic Assessment: Creating Realistic Learning Experiences*

Authentic assessments encompass a broad array of activities and assignments in which students actively construct knowledge and responses rather than passively receive information. Authentic assessments: 1) are realistic, requiring application of knowledge and skills in a “real world” context; 2) involve unstructured, complex problems that have multiple solutions, thus requiring judgment, innovation, and the ability to make informed decisions; and 3) require students to “do” discipline-specific activities or procedures, often employing a wide range of skills to address a complex problem.<sup>10</sup> A final, distinguishing characteristic defining authentic assessments is that they accommodate feedback, practice, and opportunities to revise and resubmit solutions, and thus represent both formative and summative forms of assessment.<sup>10,11</sup>

The fundamental appeal of authentic assessment is to engender deeper involvement of students in the learning

process.<sup>12</sup> An additional appeal is flexibility for the teacher—authentic assessments can be used to target specific learning objectives within a course module or throughout an entire course, enabling the teacher to direct student learning to achieve objectives that are difficult to assess through traditional assessment formats, such as collaboration, teamwork, and higher-order levels of learning. For example, combining case studies with classroom debate has been shown to be an effective application of structured controversy for teaching about ethical issues in natural resources, and promotes critical thinking, evaluation, team building, and oral communications skills.<sup>13</sup>

Authentic assessments take many forms, and are often associated with various approaches to teaching and learning, such as problem-based learning, team-based learning, and service learning, among others. At a coarse scale, they result in student-generated performances or products.<sup>11</sup> Performance assessments might require demonstration of specific skills, use and manipulation of tools and instruments, oral and/or poster presentations, debates, panel discussions, role-play, teaching, conducting experiments, or conducting interviews. Product assessments include all forms of writing, such as essays, research reports, annotated bibliographies, data analysis and interpretation, arguments and argument analysis, reviews, critiques and analysis of written work, problem analysis, planning, mapping, budget development, experimental design, peer editing, portfolios, poster, games, and podcast, video, or multimedia productions. Certainly, internet-based tools and applications such as Google Earth and Gigapan have broad appeal and are highly suitable to support learning in range science and natural resource management courses.<sup>14</sup> Mueller<sup>11</sup> provides excellent examples of a wide variety of authentic assessments, many of which can easily be adapted for context-specific applications.

### *Rubrics*

Authentic assessments span a broad range of complexity, and successful implementation requires careful planning, articulation of the assignment requirements, and clearly communicating expectations about how students can demonstrate mastery or achievement. *Rubrics* are key to ensuring alignment between learning activities, assessment of student learning, and associated learning objectives. Through the use of rubrics, teachers clearly outline specific criteria and component parts of the assignment, and provide information about what constitutes appropriate levels of performance for each component.<sup>11,15</sup> Not only are rubrics a valuable communication tool, they are highly efficient grading tools that streamline the grading process—by saving time, teachers can efficiently provide timely, objective, and informative feedback. Rubrics help students focus their efforts, which can result in better quality work, more satisfaction with grades, and reduced anxiety associated with complex assignments.<sup>16</sup> In addition, rubrics are highly versatile and easily adapted to suit specific needs. In many cases, students can be involved in both rubric



development and in using them to assess their own work and that of their peers.<sup>15</sup> Excellent guides to rubric development are available,<sup>11,15</sup> and for teachers who are interested in adapting existing rubrics, the Association for the Assessment of Learning in Higher Education (AALHE) maintains an excellent website<sup>1</sup> populated with numerous examples of rubrics targeted for a wide variety of authentic assessments.

### Conclusions: Viewing Assessment as the Carrot, Not Just the Stick

Assessment provides the mechanism by which we are able to discover how well students have learned. As such, it is a fundamental component of the educational process, necessary to ensure and verify alignment of desired learning outcomes, learning activities, and *actual learning*. Assessment provides essential feedback to both teachers and students about the level of learning that is either occurring or has been achieved. Unfortunately, rather than being viewed as an opportunity to reflect on and even celebrate what has been learned, assessment is commonly viewed as a necessary evil associated with judgment and grades. I believe that we often overlook the beneficial aspects of assessment. By making a few simple changes in our approach to assessment and by adopting a few new assessment techniques, teachers and students alike can view it as the carrot, not just the stick. Changing how we approach assessment often involves an increased commitment of time and effort, as well as a certain level of discomfort associated with trying something new or fear of disappointing results. For teachers who are interested in adopting some of the alternative assessment approaches described above, I recommend starting small, trying one or two new things, and not being discouraged if the first attempt doesn't work as well as you had hoped. An important step is to reflect on the result, figure out what worked well and what could be improved, make any necessary adjustments, and try again (don't throw in the towel after the first try!). In the long run, our approach to teaching and assessment reflects our desire to enhance the quality and depth of learning, to motivate students to embrace learning, and to promote life-long learning skills that will serve our students long after their last appearances in our classrooms.

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<sup>1</sup>The AALHE Web site can be accessed at: <http://course1.winona.edu/shatfield/air/rubrics.htm>.